

JARI/ AMAPÁ REDD+ PROJECT MONITORING REPORT GHG EMISSION REDUCTIONS FROM AVOIDING UNPLANNED DEFORESTATION IN 2012 AND 2013



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1 PROJECT DETAILS

1.1 Summary Description of Project

The Jari/Amapá REDD+ Project is a partnership between Biofíllica Investimentos Ambientais S.A. Jari Florestal and Jari Celulose, both belonging to Grupo Jari, for the promotion of forest conservation and reduction of potential GHG emissions based on a local economic development model that value the standing forest through a mosaic of activities

The Project is located in the Valley of Jari, in the municipalities of Laranjal do Jari and Vitória do Jari in the state of Amapá. The Valley of Jari enacts a very important role as home for over two thousand rural families, and as an ecological corridor connecting several Conservation Units. With a very rich biodiversity, its vegetation includes eight forest and non-forest formations, and species of extreme importance ecologically (54 species of flora are considered threatened) and socially (extractive communities have the diverse flora as a source of income and food). In the Project region three important rivers flow (Jari, Cajari and Maracá), and it is also home for over two thousand species of fauna, from which over a hundred are considered endangered.

Despite the social and environmental importance of the Valley of Jari, this region is threatened by agricultural and cattle activities and human settlements as well as large infrastructure work.

Thus, the main project components are:

- Forest protection and monitoring: implementation of conservation activities which will reduce deforestation risks;
- Scientific researches in the area: promotion of studies focused on the efficient use of natural resources and scientific research applied to biodiversity; and
- Social inclusion of the communities in the areas where the Project operates: activities developed by the Fundação Jari focusing on favoring sustainable business chains to generate additional income to the communities.

Such activities will be economically feasible with the combination of the FSC-certified Management (FSC certified low impact forest management) and the commercialization of carbon credits generated through the REDD+ mechanism.

1.2 Sectorial Scope and Project Type

Project Scope 14: Agriculture, Forest and other Land Use (AFOLU)

Project Category: Reduction Emission from Deforestation and Degradation

Type of Activity: Avoided Unplanned Deforestation (AUD)

Grouped Project: No

1.3 Project Proponent

Biofilica Investimentos Ambientais: general coordination of the socioeconomic and environmental assessment and baseline studies and carbon stock; PDD (Project Document Design) development and financing; credits validation/checking and trading; Project co-management throughout the Project lifetime.

Contact information: Plínio Ribeiro. E-mail: plinio@biofilica.com.br Phone: +55 11 3073-0430 Website: www.biofilica.com.br

Jari Florestal: responsible for the co-management of the Project, for operating the forest sustainable management, as well as all related activities such as the environmental and social management of the Project to reduce negative impacts and generate positive ones.

Contact information: João Antônio Prestes. E-mail: joao.prestes@grupojari.com.br Phone: +55 11 4689-8700 Website: www.grupojari.com.br

Jari Celulose: title and land tenure regularization; land ownership monitoring and maintenance.

Contact information: Vinícius M. Garcia. E-mail: vinicius.marcia@grupojari.com.br Phone: +55 11 4689-8700 Website: www.grupojari.com.br

1.4 Other Entities Involved in the Project

Entity	Fundação Jari
Role	Development of social activities and Project social management.
Responsible	Jorge Rafael Almeida
Contact	Phone: +55 93 3735-1140 e-mail: jorge.almeida@fundacaojari.com.br Website: www.fundacaojari.org.br

Entity	Instituto do Homem e Meio Ambiente da Amazônia - IMAZON
Role	Development of baseline studies and carbon stock.
Responsible	Carlos Souza Jr.
Contact	Phone: +55 91 3182-4000 e-mail: souzajr@imazon.org.br Website: www.imazon.org.br

Entity	Instituto de Pesquisas Ecológicas - IPÊ and Arvorar
Role	Technical coordination of the socioeconomic and environmental assessment and socioeconomic module

Responsible	Angela Pelin
Contact	Phone: +55 11 4597-1327 e-mail: angela@ipe.org.br Website: www.ipe.org.br

Entity	Center for International Forestry Research – CIFOR
Role	Carrying out Global Comparative Study on REDD+
Responsible	Amy Duchelle
Contact	Phone: +55 21 2285-3341 e-mail: a.duchelle@cgiar.org Website: www.cifor.org/

1.5 Project Start Date

The Jari/Amapá REDD+ Project starting date is February 14th, 2011, which is the date when the first socioeconomic and environmental assessment planning meeting was held.

1.6 Project Crediting Period

The Project accreditation period is February 14th, 2011. The end of the Project will be February 14th, 2041 upon completing 30 years.

1.7 Project Location

The Project is located in the Valley of Jari, in the municipalities of Laranjal do Jari and Vitória do Jari, south of the state of Amapá, on the left margin of the Jari River on the border of the state of Pará north of Brazil.

The physical boundaries of the Project area are show in the Figure 1 and **Table 1**, below:

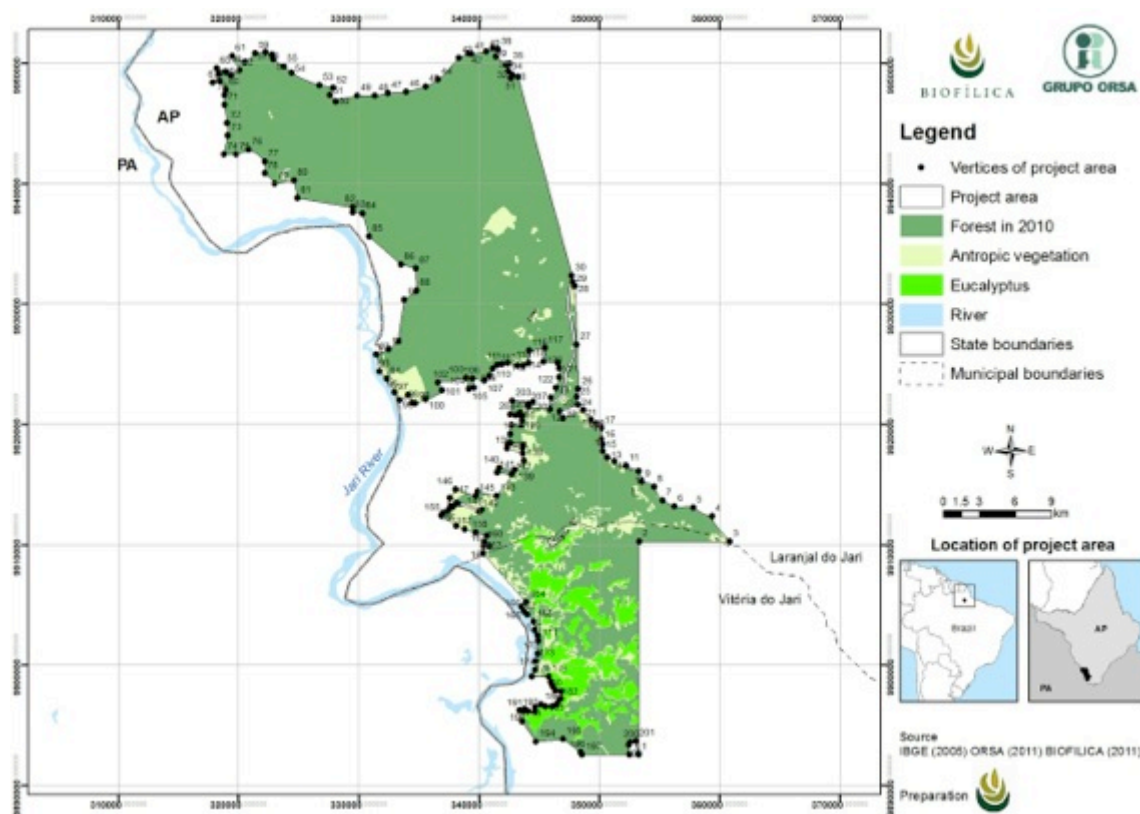


Figure 1. Jari/ Amapá REDD+ project area location

Table 1. Vertices and coordinates of the Project Area polygons. Coordinates System: UTM – Zone 22S. Datum SIRGAS 2000.

Vertex	X	Y
1	353318.346	9892531.538
2	353336.113	9910260.460
3	360870.617	9910259.451
4	359417.669	9912349.040
5	357852.884	9913054.482
6	356294.972	9913169.482
7	355299.062	9913689.483
8	354586.717	9914819.488
9	353570.587	9915231.489
10	353296.461	9916088.491
11	352283.676	9916545.493
12	351308.111	9916912.495
13	350719.453	9917246.496
14	350341.671	9917793.698
15	350329.890	9918350.699
16	350203.014	9918780.701
17	350224.576	9919679.704
18	350066.670	9919961.705
19	349744.698	9920030.706
20	349337.604	9920413.707
21	348669.650	9921222.085
22	347014.250	9920519.281
23	346766.749	9921072.021
24	348258.152	9921652.266
25	348144.379	9922295.714
26	348282.589	9922931.135
27	348146.958	9926621.449
28	347967.687	9931499.155
29	347840.497	9931818.174
30	347740.949	9932340.758
31	343283.238	9948867.336
32	342667.996	9948770.192
33	342801.992	9949038.183
34	342444.670	9949395.504
35	342578.666	9949976.152
36	342266.010	9949931.487
37	341417.371	9950556.799

Vertex	X	Y
38	341596.032	9951182.111
39	341149.380	9951271.442
40	340613.398	9951003.451
41	339347.653	9950792.464
42	339078.933	9950839.198
43	338335.474	9950467.469
44	336593.532	9948680.862
45	335566.233	9948100.214
46	333958.287	9947653.563
47	332439.671	9947519.567
48	331367.707	9947296.241
49	329904.017	9947332.892
50	328119.910	9946817.686
51	327615.832	9947385.572
52	327857.107	9947944.930
53	326722.528	9948189.545
54	324399.939	9949216.844
55	323774.627	9949752.826
56	322881.323	9950333.473
57	322768.026	9950758.337
58	322227.195	9950963.108
59	321362.707	9950824.790
60	320514.069	9950110.147
61	319486.770	9950601.464
62	320067.417	9949440.170
63	319397.440	9948993.518
64	318950.788	9949350.839
65	318191.480	9949574.165
66	318325.475	9949082.848
67	317867.095	9948400.067
68	318459.471	9948502.201
69	318950.788	9947787.558
70	318816.792	9947385.572
71	318816.792	9946581.598
72	319068.165	9945031.464
73	319084.783	9943991.018
74	318772.127	9942427.737
75	319799.426	9942427.737
76	320853.240	9942826.725
77	322211.346	9941847.090

Vertex	X	Y
78	322211.346	9940864.456
79	322984.920	9939987.285
80	324640.727	9940279.249
81	324898.723	9938816.081
82	329492.914	9938050.226
83	329524.612	9937608.832
84	330320.777	9937519.605
85	330883.536	9935625.399
86	333506.600	9933301.314
87	334751.755	9932988.134
88	334811.662	9931119.822
89	333816.452	9930342.615
90	333289.669	9926902.878
91	332514.829	9926238.314
92	331440.601	9925815.477
93	331755.752	9924409.195
94	332312.196	9923792.870
95	332969.036	9922655.581
96	333397.250	9922007.437
97	334096.984	9922453.755
98	334439.882	9921810.482
99	334735.647	9921733.236
100	335581.970	9922059.710
101	336938.741	9922802.367
102	336624.371	9923460.015
103	338926.382	9923861.224
104	339153.314	9922955.272
105	339596.602	9923065.960
106	339475.564	9923799.740
107	340462.795	9923665.194
108	340870.336	9924033.825
109	341143.524	9924600.506
110	341525.351	9924920.826
111	341930.177	9924991.188
112	342419.515	9925097.153
113	343244.124	9924897.886
114	343687.614	9924883.407
115	344145.175	9925107.274
116	344194.189	9926158.253
117	345502.883	9926348.572

Vertex	X	Y
118	345368.237	9925218.406
119	346552.360	9925110.689
120	346702.000	9924676.794
121	346703.198	9923923.271
122	346393.931	9923039.196
123	345964.310	9922212.547
124	345938.249	9921271.239
125	344153.339	9921455.849
126	343481.655	9920713.422
127	343617.986	9920686.579
128	343602.285	9920254.515
129	343520.614	9919908.443
130	342720.838	9919958.040
131	342606.773	9919214.392
132	342620.515	9918450.870
133	343697.367	9918256.384
134	343647.591	9918054.243
135	342432.822	9918315.459
136	342348.095	9918027.466
137	343674.215	9917589.276
138	343754.312	9916972.600
139	343008.062	9916218.237
140	341689.300	9916366.909
141	341554.617	9915983.724
142	342755.406	9915843.328
143	341460.097	9914071.522
144	339913.558	9914404.581
145	339737.131	9914070.387
146	338089.335	9914565.082
147	337559.221	9913911.048
148	340225.155	9912907.132
149	340033.254	9912756.827
150	338171.279	9913453.671
151	337846.052	9913150.365
152	337635.576	9913162.625
153	337485.731	9912859.531
154	337025.073	9912643.677
155	336901.834	9912410.233
156	338104.836	9911551.538
157	338811.103	9911294.017

Vertex	X	Y
158	339735.239	9911001.178
159	340651.015	9910720.361
160	340470.683	9910192.328
161	340419.345	9909881.556
162	340873.095	9909849.248
163	340359.377	9909271.239
164	343945.347	9905214.935
165	343531.941	9904836.025
166	343752.726	9904456.897
167	344012.343	9904175.930
168	344549.594	9903587.730
169	344644.891	9902903.254
170	344898.951	9902452.764
171	344975.178	9902012.209
172	344923.228	9900941.451
173	344751.916	9900329.278
174	344668.743	9899594.837
175	344414.048	9899023.057
176	345801.282	9899019.432
177	345999.783	9898625.431
178	346136.190	9898224.429
179	346338.909	9897882.428
180	346847.976	9897774.646
181	346834.692	9897221.426
182	346660.285	9897074.425
183	346476.597	9896725.424
184	346110.908	9896568.424
185	345547.500	9896532.423
186	345189.686	9896685.424
187	344702.622	9896468.423
188	344701.082	9896111.424
189	344082.681	9896156.279
190	343836.526	9896354.423
191	343743.916	9896180.851
192	343390.963	9896206.158
193	343612.527	9895309.802
194	344756.541	9893615.066
195	347028.553	9893815.130
196	348461.901	9892776.789
197	348607.373	9892538.285

Vertex	X	Y
198	352549.856	9892532.633
199	352502.984	9893355.653
200	352584.239	9893551.415
201	353064.858	9893684.107
202	344506.672	9921877.821
203	342797.827	9921958.351
204	342619.200	9920849.127
205	343082.969	9920773.651
206	343454.408	9920958.316
207	344069.488	9921651.212

1.8 Title and Reference of Methodology

Approved VCS Methodology VM0015 for Avoided Unplanned Deforestation, version 1.1.

1.9 Other Programs

The Jari/Amapá REDD+ Project has not been registered under any other GHG program. However, the Project proponents intend on submitting this project to validation/verification under the CCB Standard (Climate, Community and Biodiversity Standard). It is important to mention that the CCB Standard does not issue or register any type of carbon certificates.

Also, currently there is no national or international REDD+ regulatory regime applicable to the Jari/Amapá REDD+ Project. However, the Jari/Amapá REDD+ Project is being developed in order to integrate and comply with possible future regulatory regimes.

The Jari/Amapá REDD+ Project neither has nor intends to generate any other form of GHG-related environmental credit for GHG emission reductions or removals claimed under the VCS Program. Neither it has been submitted to validation/verification under any other GHG Program. Therefore, it has not been rejected by any other GHG Program.

2 IMPLEMENTATION STATUS

2.1 Implementation Status of the Project Activity

Jari/Amapá REDD+ Project brings together activities from two components: the certified forest management (FSC-certified Management) and the greenhouse gas emission reduction by containing unplanned and illegal deforestation and social inclusion and local socioeconomic development (REDD+).

Below are described the activities that were performed during the Project's second period of verification (15 February 2012– 14 February 2014).

Implemented activities under the FSC-certified Management component

Jari Florestal started conducting studies for the FSC-certified Management in the region where the Project is located in 2006. Under the first monitoring period (2011-2012) the main activities were related with pre-harvesting and planning activities. During the second monitoring period (2012-2014 and 2013-2014) efforts were directed to follow all legal procedures required to get SFM operation official approval from the governmental responsible body. The Project proponents carried out all the requirements and requests from the governmental body (IBAMA), including a public consultation and responding to corrections requests and clarifications requests. Project Proponents is currently waiting for IBAMA approval in order to initiate the harvesting.

A Summary of all main activities, carried out by the Project Proponents under this monitoring period, regarding the FSC-Certified Management is shown in **table 2**, below. The complete table of activities related to FSC-Certified Management and its updated status is provided as an annex of this document, along with the implementation chronology updated.

The “Authorization Procedures” were not described in the previous complete table (provided on the Project Description), however Project Proponents now have a better understanding of importance to describe time and efforts allocated on bureaucracy and official procedures and decided to highlight it, as an adaptive measure. Authorization Procedures will be repeated every year, once the SMP is approved and the harvesting is started, because to harvest every “Annual Production Unit” (UPA, Portuguese acronym) it is necessary to have an “Annual Operation Plan” (POA, Portuguese acronym) also approved by IBAMA.

Table 2. Summary of Jari/Amapá REDD+ Project main activities in FSC-certified Management component executed during this monitoring period (2012 - 2013).

ACTIVITY	DESCRIPTION	STATUS, APPLICABLE PROCEDURE AND ADDITIONAL INFORMATION REGARDING RECORDING FORMAT
Authorization procedures		
SFM Plan submission	All information and data generated from 2006 to 2011 were consolidated on the Sustainable Forest Management Plan and submitted to IBAMA's appraisal, by Jari Group. IBAMA (www.ibama.gov.br) is the Brazilian Institute of Environment and Natural Resources is the responsible of approving SFM activities on Amapá State.	Conducted from 2011 to 2012. Though the SFM Plan were submitted December 2011 a few additional information/documents were requested and provided to IBAMA during 2012.
SFM evaluation by the governmental authorized body	During this phase IBAMA evaluated the Sustainable Forest Management Plan submitted along with all additional information and documents provided by Jari Group.	From 2012 to 2013 all SFM documents were under IBAMA's analysis.
Response to further information and corrections request	After IBAMA's evaluation further information/documents were requested, along with some corrective action and adaptations and clarifications.	During 2013 and 2014 IBAMA's information, documents and corrections requested were addressed.
Stakeholders consultation	IBAMA also requested a stakeholders consultation to assess SFM Plan impacts on surrounding Protected Areas, specially Cajari extrativist Reserve.	Meetings and consultation were carried from 2013 to 2014.
SFM Plan Approval	Final approval of the Sustainable Forest Management Plan by IBAMA.	Project Proponents are currently waiting for SFM Plan final approval.

The harvesting has not occurred in the Project Area during the monitoring period once project Proponents are still waiting for the Sustainable Forest Management Plan approval.

Implemented activities under the REDD+ component

REDD+ component activities are under responsibility of Biofíllica Investimentos Ambientais, Jari Celulose, Jari Florestal and Fundação Jari, and started in February 14th 2011, when the first planning meeting for the Socioeconomic and Environmental Diagnosis was held in Monte Dourado – PA. The activities under the first monitoring period (2011) focus on the conception of the Project and development of basic studies, meetings with stakeholders – such as local and state government institutions and local communities –, security and land surveillance and prospection of buyers for Project's credits, ensuring the continuation of the Project.

Under the second monitoring period (2012 and 2013) the major focus were given to Project' social aspects. For instance efforts were directed on having a better understanding of communities needs and demands, to better outline our intervention focus regarding social activities, to inform and capacitate communities on REDD+ matters and to design social baseline on the family level. Since Project's deforestation events chain is intrinsic related with slash-and-burn cycle an appropriated social intervention is crucial to an effective leakage prevention.

Other activities were also directed to biodiversity especially through presenting Jari's REDD+ initiative to researches the already developed biodiversity monitoring and assessment and discuss possibilities to incorporate REDD+ specificities on their research.

Regarding emissions reductions monitoring all the monitoring procedures were followed to identify new deforestation areas within the Project Area and the Leakage Belt, these areas once remotely identified were verified at field and a "Deforestation Monitoring Report" were consolidated for each project year (2012 and 2013).

A summary of implemented activities during the second monitoring period (2012 and 2013) is shown in **table 3**. The complete table of activities related with the REDD+ component, as set in the Project Description, is provided as an annex to this document, along with the implementation chronology updated.

Table 3. Summary of Jari/Amapá REDD+ Project main activities developed under this monitoring period (2012-2013).

ACTIVITY	DESCRIPTION	STATUS, APPLICABLE PROCEDURE AND ADDITIONAL INFORMATION REGARDING RECORDING FORMAT
Management and conception design activities		
Carrying out a workshop to plan and design the project.	Proponents and partners of the project meet to present the results of previous studies, identification of potential social and environmental activities to be developed throughout the project as well as definition of the project monitoring actions.	Concluded in 2012. See document <i>Relatório de Despesas Projeto REDD+ Jari/Amapá – Período de Monitoramento Fev.2011- Fev.2012</i> .

ACTIVITY	DESCRIPTION	STATUS, APPLICABLE PROCEDURE AND ADDITIONAL INFORMATION REGARDING RECORDING FORMAT
Preparation of the Project description document	From the management plan the Project description document (Project Description) was prepared according to the criteria established by the VCS.	Concluded in 2012. See VCS Project Description: Jari/Amapá REDD+ Project
Selection and contracting of validation agency and registration platform	Survey of validation/verification institutions accredited by the VCS and definition of the project validation/verification bodies (VVB).	Concluded in 2012 with selection of SCS – Scientific Certification Systems. See document SCS Assessment Services Agreement
Conduction of the auditing process for validation and first verification	SCS Global Services carried Project's validation and first verification process. Desk and field auditing were carried during 2012. Second round of findings responses were carried during the beginning of 2013 and Validation and Verification Statements were issued April 2013.	Concluded in 2013. See: Biofíllica's Council Meeting minutes from 2012 and 2013; SCS Global Service reports and statements.
Management and Monitoring Activities		
Social Management	During 2012 qualified information workshops were carried on the selected communities and the first "Technical Chamber", Project's stakeholders communication meeting were realized and (evaluating the importance of small scale agriculture based on the slash-and-burn cycle on regional deforestation) project proponent proposed the promotion Technical Assistance and Rural Extension (TARE) services to engaged families. Fundação Jari started to work with TARE on REDD+ communities during 2013. The work was initiated with qualified information workshops and participative organizational diagnosis implemented on the community level, aiming to identify main needs and demands from the communities and discusses them on our "Technical Chamber". On the family level it was initiated a family socioeconomic diagnosis to better adapt TARE services to each family reality. 5 Technical Chamber meetings were conducted during this monitoring period (2012 and 2013).	Continuously throughout the Project. See: Biofíllica's Council Meeting minutes from 2012 and 2013; Contract between Biofíllica and Fundação Jari; and Fundação Jari's reports on Jari/Amapá REDD+ Project.
Environmental Management	During 2013 several meetings were conducted with researches responsible for Jari Group's Biodiversity Monitoring in order to adapt their current methodology and incorporate a few	Continuously throughout the Project. See: Biofíllica's Council

ACTIVITY	DESCRIPTION	STATUS, APPLICABLE PROCEDURE AND ADDITIONAL INFORMATION REGARDING RECORDING FORMAT
	specificities of REDD+. The main goal was to implement more sustainable and efficient monitoring strategy, considering different stakeholders interests. In parallel regular monitoring expeditions were carried in 2012 and 2013 by Lavras and Lancaster Universities regarding fauna, and by Embrapa regarding flora and SFM.	Meeting minutes from 2012 and 2013;
Permanent control of quality	This section was thought to report quality control regarding SFM activities (reduce and mitigate its social and environmental impact). Since we had a delay on initiating SFM activities we had not started this activity yet.	Continuously throughout the Project.
Monitoring of deforestation and emissions	Besides regular security and surveillance activities and patrols, the monitoring of deforestation ex post dynamics was monitored through satellite images, GIS analysis, field inspections and annual deforestation reports.	Completed for 2012 and 2013. Continuously throughout the Project. See: Biofilica's Council Meeting minutes from 2012 and 2013; Annual Deforestation reports for 2012 and 2013; and Strategic Workshop Minute (October 2014).
Conduction of Verification Process	Initiated only during 2014.	Continuously throughout the Project. Though expected every 2 years.
Updating and complementation of studies, and new studies support	The Participative Organizational Diagnosis at the community level and the socioeconomic familiar diagnosis allowed us to update Jari/Amapá' socioeconomic baseline. Jari/Amapá REDD+ Project also cooperated with CIFOR's Global Comparative Study during its first field assessment (2012), data analysis and reports and paper production (2013).	Continuously throughout the Project. See: Biofilica's Council Meeting minutes from 2012 and 2013; Fundação Jari's reports on Jari/Amapá REDD+ Project; CIFOR's reports and papers.
Project's Financial Management		
Prospection of potential buyers of the Project's VCUs	In order to ensure the Project's longevity, Biofilica Investimentos Ambientais continuously searches for potential buyers of the VCUs to be generated by the Project. Such activities consist in	Started in 2011 and to be continued throughout the Project duration. First Jari/Amapá VCU sale was effectuated in 2013.

ACTIVITY	DESCRIPTION	STATUS, APPLICABLE PROCEDURE AND ADDITIONAL INFORMATION REGARDING RECORDING FORMAT
	participating in related events, relationship with potential buyers and sales representative.	See document: Biofilica's Council Meeting minutes from 2012 and 2013.
Project's budget follow up	Income and expenses spreadsheet	Started in 2011 and to be continued throughout the Project duration. See document: <i>Relatorio de Despesas Projeto REDD+ Jari/Amapá 2012 and 2013.</i>

Analysis of land-use and land cover change during the monitoring period

The analysis of land-use and land cover change during the monitoring period was carried out following the procedures described on the item 2.4 of the Project Description, though PRODES data. The main activities carried out by the PRODES Project to monitor the Brazilian Amazon forest cover are presented hereafter.

Pre-processing

Images pre-processing procedures carried out by PRODES consist of the following steps (Câmara et al, 2006):

- Selection of images with less cloud coverage, shooting date closer to Amazon dry season and adequate radiometric quality;
- Georeferencing of the images with spatial resolution of 30 meters with topographic charts in a 1:100,000 scale and NASA images in MrSID orthorectified format.

Interpretation and classification

The satellite images classification method used by PRODES follows four main steps. The first is the generation of a spectral mixture model in which vegetation, soil and shadow components are identified; this technique is known as spectral linear mixture model and aims to estimate the percentage of vegetation, soil and shadow component for each pixel of the image. The second step is the application of the segmentation technique which identifies in the satellite image the spatially adjacent regions (segments) with similar spectral characteristics; after segmentation there is the individual classification of the segments to identify forest classes, non-forest vegetation and deforestation (anthropic vegetation). Finally, the classified segmentation result is submitted to an editing process, or classification audit, carried out by a specialist and finalizing with the creation of state mosaics.

Map accuracy assessment

PRODES mapping evaluation was carried out by comparison of each of the classes of the land-use and land-cover map (2012 and 2013) with a set of 66 points randomly distributed over the monitored area (Project Area and Leakage Belt). Reference data used come from the point

obtained by visual interpretation of images from SAR sensors with high resolution and with support from the Google Earth images. The following map shows the randomly distributed points.

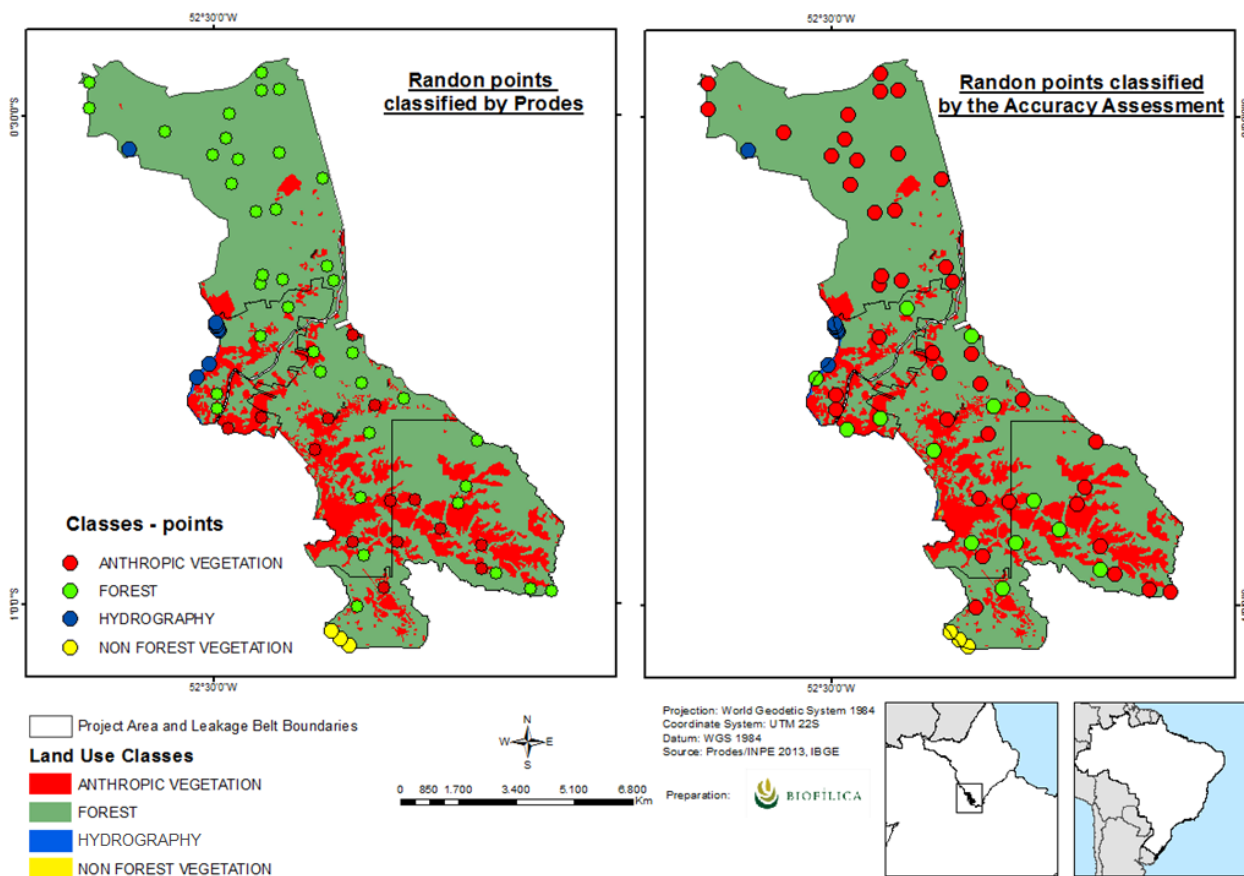


Figure 2. Map accuracy assessment.

Having the reference points and the land-use and land-cover map of the monitoring period, it was possible to evaluate the performance of the monitoring process by analyzing the confusion matrix (**table 4**) as per Congalton (1999). The overall accuracy of the monitoring process for the land-use classes at the monitored area presented values above 80%.

Table 4. Confusion matrix of the monitoring period.

		REFERENCE				Total	User accuracy %
CLASSIFIED		Forest	Anthropic vegetation	Hydrography	Non-Forest vegetation		
	Forest	38	1			39	97
	Anthropic vegetation	2	12			14	86
	Hydrography	1		9		10	90
	Non-forest vegetation				3	3	100
	Total	42	12	9	3	66	
		Producer accuracy %	90	100	100	100	

The confusion matrix was made based on a stratified random allocation of points with the aim to sample all the land use land change classes. A total of 66 points were used in the accuracy assessment, which is more the suggested in the Project Description, being 53 points randomly distributed in classes Anthropogenic Vegetation (post-deforestation class) and Forest and additional 13 points randomly assigned to Hydrography and Non-forest Vegetation classes. It is important to highlight that Hydrography and Non-forest Vegetation represents, respectively 0.23% and 0.04% of the monitored region, however, in order to provide comparability with the analysis carried out in Project Description and additional effort (stratified randomization) were applied in this monitoring period.

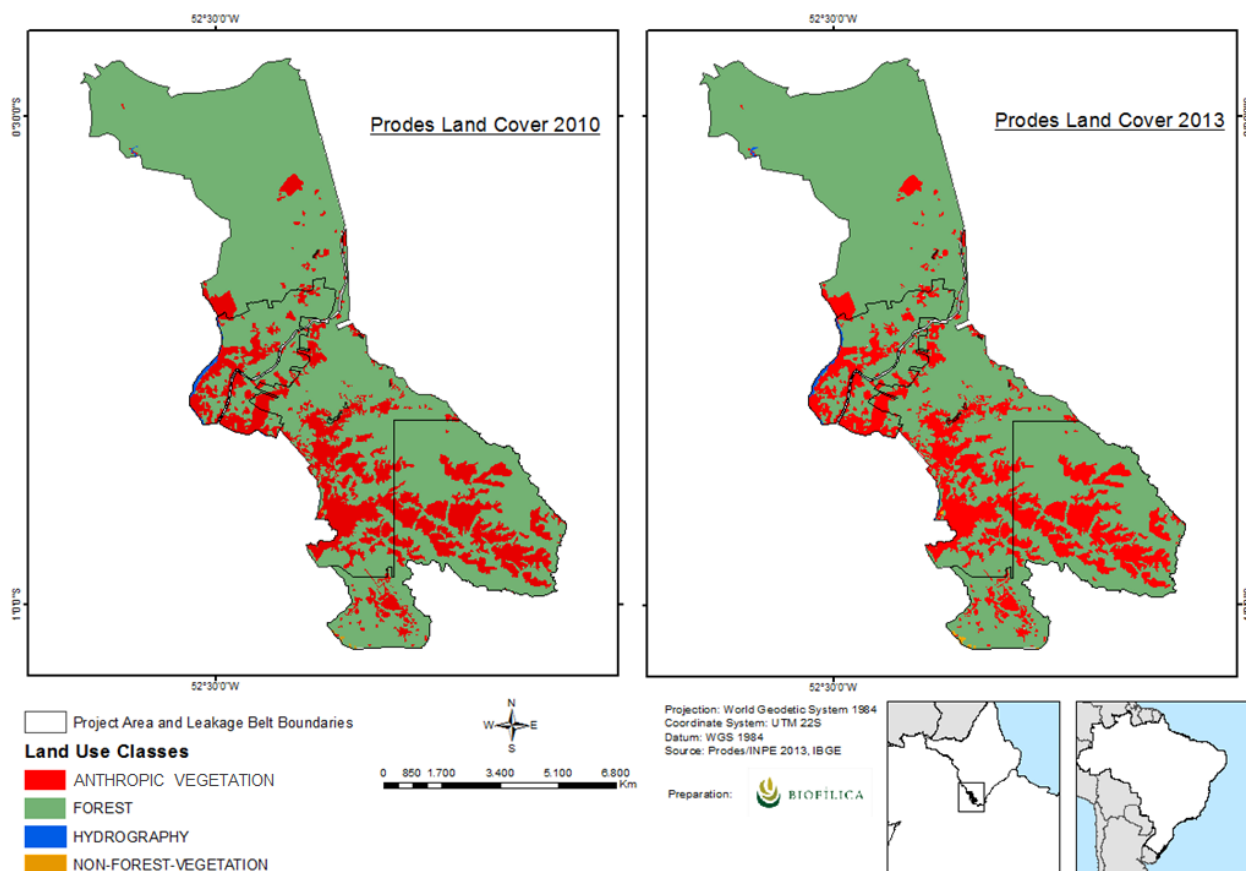


Figure 3. Map showing LU/LC classes within the monitored area in 2010 (benchmark) and 2013,

Since in this monitoring report we were dealing with ex post deforestation monitoring, 100% of deforestation polygons identified by PRODES for Project Area and the Leakage Belt were also checked in the field. This procedure allows us to evaluate deforestation accuracy and also check the agent and driver of deforestation in each case. The afield checking was carried through the process illustrated on the diagram below:

All results of the field checking on LU/LC maps created during the monitoring from 2012 and 2013 deforestation are present in the “Annual Deforestation Bulletin 2012” and in the “Annual Deforestation Bulletin 2013”, provided to the VVB.



Biofilica:

- Identify new deforestation areas;
- Generates maps and coordinates to support ground-thruthing:

Grupo Jari:

- Verify new deforestation areas based on the generated coordinates;
- Returns it with causes

Biofilica:

- Design the monitoring report to verification;
- Emissions reductions credits are generated.

Leakage prevention activities implemented during the monitoring report

The proposed social activities have an intrinsic relationship with leakage prevention strategy. Considering the chain of events that lead to the deforestation on Project's Reference Region people that have migrated to the area seeking job opportunities due to the implementation of large infrastructure projects end up staying in the region. First they go to the rural area and deforest to develop small-scale agriculture and grazing for their livelihood and to “demarcate” their possession of the land.

The squatter (small farmers) keep their production in a extremely challenging scenario, where there is a enormous lack of public policies and if there is any public policy it is hard to access or there is no enough resources (financial and human) to implemented in loco. In this scenario they develop a low productive and inefficient activity, based on the “slash and burn cycle” (seeking always for opening new forested lands) or migrate to the urban area where they hardly find good job opportunities and become marginalized. After the (already deforested) land is abandoned more capitalized farmers acquire it to develop an even more aggressive agricultural activity.

Therefore Jari/Amapá REDD+ project aims to keep this small farmer on their land, but helping them to have a better and more sustainable production, improving their income and their access to public policies. Keeping this farmer on their land is a way of improving their quality of live and preventing leakage, once the slash and burn cycle is contained and the arrival of new and more aggressive farmers is prevented.

The social activities implemented on 2012 and 2013 were:

- 5 meetings of the Technical Board;

Technical Board is a meeting between Project Proponents, Fundação Jari, communities assisted and relevant local stakeholders, especially from the government. The goal is to facilitate access to public policies.

- 15 Workshops of Participative Organizational Development in 5 assisted communities.

The Organizational Participative Development is a methodology to mediate the building of a development plan in a participative manner. The Community Development Plan built in each community (Núcleo Laranjal, Féa em Deus, Iguarapé das Pacas, Nova Conquista and Agua Azul) was the base of the discussions with governmental representatives in the Technical Board.

- 1 Extraordinary Technical Board focus on land tenure;

One of the meetings of the Technical Board was organized to especially deal with land tenure issues. The Governmental Body responsible our especial guest (IMAP – Instituto de Meio Ambiente e Ordenamento Territorial do Amapá), and their representatives were able not just to clarify land tenure issues to the communities but also to dialogue about environmental authorizations required by law, that the majority of the farmers wanted to talk about.

- 50 small farmers assisted by Fundação Jari (FJ) team;

The regular technical assistance provided by FJ is mostly on the following topics: Rural Extension and Technical Assistance; Environmental management of their land; Açaí production; and safeguarding of human rights;

Any of these activities described above are related with reducing carbon stocks and increase GHG emission in comparison with the baseline scenario. Even the technical assistance aims to help farmers to produce in a more sustainable way. More detailed information can be found on Fundação Jari reports (to be provided to the VVB).



Figure 4. Extraordinary Technical Board to deal with Land Tenure, carried out in December 2013 at Fundação Jari.



Figure 5. Participative Organizational Development Workshop carried out at Fé em Deus Community in 2013.

Monitoring of leakage and management of non-permanence risk factors

The monitoring of leakage was realized through satellite images, allowing the mapping of the forest cover in the leakage belt, as described in section 4.3 of the monitoring report.

As a result of the monitoring of deforestation in the leakage belt through satellite images, it was possible to verify that no leakage has occurred.

Regarding the non-permanence risk factors, the main risks are related to the Internal Risks, and they have been monitored as follows:

- When illegal activities were identified in the Project region, Grupo Jari took the necessary measures, such as registering the occurrence at the competent government institution. Related documents are filed by Biofilica Investimentos Ambientais and were made available to the VVB.
- As part of the communication plan with the stakeholder, the first meeting of the Technical Chamber of REDD+ took place in August 2012 with the participation of local and state government institutions and community representatives, as described on Section 7 of the Project Description, and others Technical Chamber editions happened at least twice a year since then. The Project proponents also carried a consultation with the involved communities and every Technical Chamber meeting their representatives are welcome to report communities feelings, complains and suggestions regarding the project. Presence list of such meetings are filed by Biofilica Investimentos Ambientais and were made available to the VVB.
- Grupo Jari has registered in the competent governmental institution the wiliness to protect the Project by legally binding commitment, that is, to register its property's Legal Reserve (Document IMAP 11/2011 DIPRE/IMAP). Grupo Jari keeps a constant communication with such governmental institution in order to keep track of the status of process.

2.2 Project Description Deviations

2.2.1 Methodology Deviation

Not applicable.

2.2.2 Project Description Deviation

According with the AFOLU Requirement 3.4, Section 3.13, proponents shall identify potential negative environmental and socio-economic impacts and shall take steps to mitigate them. Additional standards such as the Climate, Community & Biodiversity Standards (CCBS) or Forest Stewardship Council (FSC) certification may be applied to demonstrate social and environmental benefits beyond GHG emissions reductions or removals.

Initially the negative impacts identified were related directly with the harvesting operations (e.g. smoke, noise and residues), population migration due to the employment opportunities, and possible negative impacts from Fundação Jari activities, such as time invested by the producers to attend Project's meetings and workshops.

After the validation of the Jari/Amapá REDD+ Project, through an FSC demand, Jari group carried out an assessment of impacts from all its forestry operations. Regarding the Sustainable Forest Management of the Native Forest the activities evaluated as potential source of impacts are:

- Forestry inventory: disturb to the communities through the opening of new roads; better access for the communities through the opening of new roads; disturb to the communities due to the coming of illegal hunters
- Felling and sawing trees: accidents with trees falling on the road; Disturb due to the chainsaw noise; changing on the natural resources supply (hunting meat)
- Dragging and transporting the timber: accidents due to the equipment's traffic; disturb due to the equipment's noise; improvement of the road network; Access difficulty in communities far from the forest management
- Roads maintenance: better access for the traditional communities; better access to outsides and illegal activities
- All forestry operations: employment opportunities; qualification of labor force; contribution to the rural exodus; improvement of living conditions; improvement of communication channels close to the field operation; insufficient communication with regions far from the field operation;
- Fundação Jari activities: better access to public policies and rights guarantee; improvement of living and hygienic conditions of the families; income generation; improvement on the communications channels with the communities; maintenance of producers in the communities; increasing dependence of the producers on the Fundação Jari; conflicts between projects participants; better community organization; use of degraded lands; improvement and continuous formations and training of communities leaderships.

For each of this identified impacts that is the identification of impact class (A – The impact harms someone or some community; B – It is a positive impact and need to be maintained or improved), probability (R - Real; P – Potential), the level of influence (D – direct; I – Indirect), the action to be taken (minimize, mitigate, improve, monitor), preventive and mitigation actions that could be done by the forestry sector and/or by Fundação Jari. The impacts spreadsheet was made available.

Recently, through new discussions with Fundação Jari, Jari Florestal and Quality and Environmental Department team additional impacts have been identified, especially:

- Possible damage in the Brazil Nut trees
- Access restriction to the Brazil Nut trees and other non-timber forest products

The Brazil Nut tree, along with other non timber forest products, such as copaiba and andiroba, are important resource source for the local traditional communities. For this reason any tree specie valuable to the communities livelihood are harvested. The Brazil Nut is even protected by a Brazilian Federal Law (Federal Decree nº 5.975 from November 30th 2006).

On it management plan Jari Group commits no to explore none of the species with especial interest from the communities and not to restrict their access to this resources. As a mitigation, the main important “castanhais” (areas with high concentration of Brazil Nut trees were identified with Fundação Jari support, so they were not harvested and during the planning and forest inventory to support every annual operation (POAs – Annual Production Unit), when a census is made previously to the harvesting every “social interesting tree” is mapped, especially the Brazil Nut tree, copaiba and andiroba. Thus, they can plan the harvesting without damaging the trees, and during the harvesting signs and warnings are distributes in the operation site, and the surround communities are warned. The ground mapping of each tree has not happened so far in the Project Area because the forest management hasn't started yet.

Workshops with the communities close to each POA are planned to happen once the forest management plan is approved to explain the harvesting process and possible impacts and risks for them.

It is important to state that the project proponent has also the commitment of promoting workshops with each community participating with the end to identify potential risks and negative impacts, until the next verification period, in order to address possible new impacts identified.

Regarding AFOLU Requirements 3.4, Section 3.3.1, projects shall have a credible and robust plan for managing and implementing the project over the project's crediting period.

The SFMP proposed activities are to be hold during the entire crediting period, considering that there are 25 planned UPAs (Annual Production Unit), one UPA is to be harvested per year once the SFMP is approved.

To manage this UPAs, every year the activities mentioned on VCS PDD, table 6 (summary of Jari/Amapá REDD+ Project main activities in the FSC-certified Management component), page 16, should be implemented. The SFM is expected to start in 2016, these activities should happen every year until 2041, which contemplates the whole crediting period.

In regard of the VCS and CCB proposed activities, they are mainly to be continuous over the years, and expected to happen every year during the Project lifetime. For instance, all the activities described on CCB PDD, table 6 (casual relationships that explain how each project activity will delivery expected climate, community and biodiversity benefits), page 33, are expected to happen every year during the project lifetime.

The exceptions are to the following activities:

- **Organizational Participatory Assessment and Community Development Plans** – To be implemented every time a new community is engaged and with already engaged communities every 5 years;
- **Family Assessment** – Every two years with engaged communities only;
- **Structuring of the Jari Socio-environmental Fund** – To be developed during 2015 and 2016.

A more detailed schedule of activities (containing items 4 and 5 of Table 7 in the CCB PDD) was made available to the auditor through a finance plan to implement activities proposed. It is important to highlight following:

- Since this schedule has the goal of supporting the financing estimative some activities were aggregated. For instance some of the social activities described in table 6 of the CCB PDD, that will be regularly implemented by Fundação Jari, are considering all together;
- In order to be more accurate the investment plan were based in a shorter term, until 2021 (when the Project completes 10 years). This decision was made taking into account more clarity of the investments needed to implement each activities;
- All the proposed activities are revised every year and the Project aims to adopt adaptive management practices. In this manner a few adjustments may be done regularly considering communities demands and resources availability. According with the proposed governance flow to the Socio-environmental Fund, every year the Management Committee will get together to discuss investments priorities, and the same discussion will be made through the technical board.

Thus, this is a robust and sustainable implementation plan because it considers year by year priority and resources availability, being therefore adaptable, and already considering the minimum amount of investment and strategic activities to be implemented.

2.3 Grouped Project

Not applicable.

3 DATA AND PARAMETERS

3.1 Data and Parameters Available at Validation

Data Unit / Parameter:	Deforestation
Data unit:	Hectare (ha)
Description:	Maps of forest coverage areas converted into non-forest areas.
Source of data:	Measured through data from PRODES/INPE project.
Value applied:	0,269% ha/year on average (2000-2010).
Purpose of the data:	For deforestation mapping and production of the Forest Cover Benchmark Map data from PRODES Digital (official Brazilian Amazon Forest deforestation satellite mapping) program were used. A total of 28 Landsat images were used during the analyzed period. The ISOSEG non-supervised classification method was used in the classification of the images to map forest classes, non-forest vegetation, hydrography and deforestation.
Any comment:	See documents: • <i>Câmara et al. 2006. Metodologia para o cálculo da taxa anual de desmatamento na Amazônia Legal</i> • <i>Determinação da Linha de Base e Dinâmica de Desmatamento para o Projeto REDD+ Jari/Amapá.</i>

Data Unit / Parameter:	Ctot
Data unit:	tCO ₂ e ha ⁻¹
Description:	Average carbon stock per hectare in all carbon pools in the forest class used in the baseline scenario.
Source of data:	Calculated by allometric equations, expansion factors from literature and Jari Florestal field measured data.
Value applied:	566 tCO ₂ e ha ⁻¹
Purpose of the data:	Above-ground biomass estimate was carried out using forest inventory data, allometric equations developed in areas similar to the project area (HIGUCHI, 1998). And expansion factors developed by Nogueira et al. (2008) in sites of the Brazilian Amazon to estimate biomass of trees with DBH lower than 10 cm, palm trees, vines, non-tree components and dead above-ground biomass . Below-ground biomass was obtained using root-shoot ratio of 25.8% biomass of trees DBH> 10cm. Total biomass spatial estimate was obtained applying geostatistics techniques developed by Sales et al. (2007).
Any comment:	See documents: • <i>Estimativa do Estoque de Carbono Florestal para o Projeto REDD+ Jari/Amapá.</i> • <i>PMFS – Amapá.</i> • Section 3.1 of the Project Description • Tabela_Estoque_TDR4_2013.xlsx

Data Unit / Parameter:	DBH
Data unit:	cm
Description:	Diameter at Breast Height (130 cm) for each tree with DBH equal or higher than 15 cm in each plot of the forest inventory.
Source of data:	Measured in the field by Jari Florestal.
Value applied:	See field measurements spreadsheet.
Purpose of the data:	VCS Methodology VM0015 requirement. Data from forest inventory collected less than 10 years ago from multiple plots at wide spatial distribution.
Any comment:	Jari/Amapá REDD+ Project's main variable for carbon stock estimate.

Data Unit / Parameter:	$\ln(P_i) = -1.497 + 2.548 \times \ln(DBH)$
Data unit:	Ln kg (fresh weight)
Description:	Equation to convert DBH into biomass for trees with DBH equal to or higher than 5 cm.
Source of data:	Higuchi et al (1998) Biomassa da parte aérea da vegetação da floresta tropical úmida de terra-firme da Amazônia brasileira. Acta Amazonica 28(2): 153-166. 1998.
Value applied:	$\ln(P_i) = -1.497 + 2.548 \times \ln(DBH)$
Purpose of the data:	Equation developed for forest with characteristics similar to the forests in the reference region.
Any comment:	

Data Unit / Parameter:	R_j
Data unit:	Dimensionless
Description:	Above-ground to below-ground biomass conversion factor using shoot-root ratio.
Source of data:	VCS VM0015 methodology
Value applied:	25.8%
Purpose of the data:	Value suggested by VCS VM0015 methodology.
Any comment:	

Data Unit / Parameter:	Expansion factor to convert fresh weight biomass into dry weight biomass
Data unit:	Dimensionless
Description:	Expansion factor to convert fresh weight biomass into dry weight biomass
Source of data:	The value was obtained by the average of dry/fresh ratio for the crown and bole weighted by the percentage contribution of bole and crown weight to total biomass. HIGUCHI, N., DOS SANTOS, J., RIBEIRO, R. J., MINETTE, L., BIOT, Y. Biomassa da parte aérea da vegetação da floresta tropical úmida de terra-firme da Amazônia brasileira. Acta Amazonica 28(2): 153-166. 1998.
Value applied:	0.5997
Purpose of the data:	Values calculated in forests with similar characteristics to the forests in the reference region.
Any comment:	

Data Unit / Parameter:	Expansion factor to estimate palm trees biomass for dense forest
Data unit:	Dimensionless
Description:	Expansion factor to convert biomass of trees DBH > 10cm into biomass of palm trees for dense forest.
Source of data:	Nogueira, E.; Fearnside, P.; Nelson, B., et al., 2008. Estimates of forest biomass in the Brazilian Amazon: New allometric equations and adjustments to biomass from wood-volume inventories. Forest Ecology and Management, 256(11), pp.1853-1867
Value applied:	0.019
Purpose of the data:	Value suggested by VCS VM0015 methodology.
Any comment:	

Data Unit / Parameter:	Expansion factor to estimate palm trees biomass for non-dense forest
Data unit:	Dimensionless
Description:	Expansion factor to convert biomass of trees DBH > 10cm into biomass of palm trees for non-dense forest
Source of data:	Nogueira, E.; Fearnside, P.; Nelson, B., et al., 2008. Estimates of forest biomass in the Brazilian Amazon: New allometric equations and adjustments to biomass from wood-volume inventories. Forest Ecology and Management, 256(11), pp.1853-1867
Value applied:	0.086
Purpose of the data:	Values calculated in forests with similar characteristics to the forests in the reference region.
Any comment:	

Data Unit / Parameter:	Expansion factor to estimate biomass of trees with DBH<10 cm for dense forest
Data unit:	Dimensionless
Description:	Expansion factor to convert biomass of trees DBH > 10cm into biomass of trees <10 cm in DBH for dense forest
Source of data:	Nogueira, E.; Fearnside, P.; Nelson, B., et al., 2008. Estimates of forest biomass in the Brazilian Amazon: New allometric equations and adjustments to biomass from wood-volume inventories. Forest Ecology and Management, 256(11), pp.1853-1867
Value applied:	0.065
Purpose of the data:	Values calculated in forests with similar characteristics to the forests in the reference region.
Any comment:	

Data Unit / Parameter:	Expansion factor to estimate biomass of trees with DBH<10 cm for non-dense forest
Data unit:	Dimensionless
Description:	Expansion factor to convert biomass of trees DBH > 10cm into biomass of trees <10 cm in DBH for non-dense forest
Source of data:	Nogueira, E.; Fearnside, P.; Nelson, B., et al., 2008. Estimates of forest biomass in the Brazilian Amazon: New allometric equations and adjustments to biomass from wood-volume inventories. Forest Ecology and Management, 256(11), pp.1853-1867
Value applied:	0.040
Purpose of the data:	Values calculated in forests with similar characteristics to the forests in the reference region.
Any comment:	

Data Unit / Parameter:	Expansion factor to estimate biomass of vines
Data unit:	Dimensionless
Description:	Expansion factor to convert biomass of trees DBH > 10 cm into biomass of palm trees into vine.
Source of data:	Nogueira, E.; Fearnside, P.; Nelson, B., et al., 2008. Estimates of forest biomass in the Brazilian Amazon: New allometric equations and adjustments to biomass from wood-volume inventories. Forest Ecology and Management, 256(11), pp.1853-1867
Value applied:	0.031
Purpose of the data:	Values calculated in forests of similar characteristics to the forests in the reference region.
Any comment:	

Data Unit / Parameter:	Expansion factor to estimate dead wood biomass
Data unit:	Dimensionless
Description:	Expansion factor to convert biomass of trees DBH > 10 cm into biomass of dead wood
Source of data:	Nogueira, E.; Fearnside, P.; Nelson, B., et al., 2008. Estimates of forest biomass in the Brazilian Amazon: New allometric equations and adjustments to biomass from wood-volume inventories. Forest Ecology and Management, 256 (11), pp.1853-1867
Value applied:	0.137
Purpose of the data:	Values calculated in forests of similar characteristics to the forests in the reference region.
Any comment:	

Data Unit / Parameter:	Expansion factor to estimate non-tree components biomass
Data unit:	Dimensionless
Description:	Expansion factor to convert biomass of trees DBH > 10 cm into biomass of non-tree components
Source of data:	Nogueira, E.; Fearnside, P.; Nelson, B., et al., 2008. Estimates of forest biomass in the Brazilian Amazon: New allometric equations and adjustments to biomass from wood-volume inventories. Forest Ecology and Management, 256 (11), pp.1853-1867
Value applied:	0.002
Purpose of the data:	Values calculated in forests with similar characteristics to the forests in the reference region.
Any comment:	

Data Unit / Parameter:	IC
Data unit:	m ³
Description:	FSC-certified forest management forecast harvest intensity.
Source of data:	<i>Plano de Manejo Florestal Sustentável-Amapá</i>
Value applied:	20m ³
Purpose of the data:	Average intensity of the harvest for timber Expected in each UPA of the <i>Plano de Manejo Florestal Sustentável-Amapá</i> .
Any comment:	

Data Unit / Parameter:	CF
Data unit:	t
Description:	Carbon content in dry biomass
Source of data:	Nogueira, E.; Fearnside, P.; Nelson, B., et al., 2008. Estimates of forest biomass in the Brazilian Amazon: New allometric equations and adjustments to biomass from wood-volume inventories. <i>Forest Ecology and Management</i> , 256 (11), pp.1853-1867
Value applied:	0.485
Purpose of the data:	Value found in scientific literature.
Any comment:	

Data Unit / Parameter:	44/12
Data unit:	tCO ₂ e
Description:	Carbon mass to CO ₂ e mass conversion factor.
Source of data:	From scientific literature: 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 4 AFOLU.
Value applied:	44/12
Purpose of the data:	IPCC standard value
Any comment:	

3.2 Data and Parameters Monitored

Data Unit / Parameter:	Deforestation in the Project Area and Leakage belt
Data unit:	Hectare (ha)
Description:	Forest coverage areas converted into non-forest areas inside the Jari/Amapá REDD+ Project area and leakage belt.
Source of data:	Calculated through Landsat TM5 images acquired in 24/06/06/08/2012 and 18/09/2013, processed by the PRODES Digital project and additional Cosmo SkyMed ScanSar images acquired in 21/04/2012, 23/05/2012 and 26/10/2013.
Description of measurement methods and procedures to be applied:	The monitoring of the forest coverage in the project area and leakage belt was conducted through satellite image analysis and Geographic Information System. Images of spatial resolution of 30 m were used in the mapping carried out by automatic classification from optical image and visual interpretation of images from SAR data.
Frequency of monitoring/recording:	Annual
Value monitored:	103 ha in project area, 72 ha in leakage belt(2012) and 25 ha in PA, 67 ha in LK(2013)
Monitoring equipment:	Geographic information systems, digital processing program, and navigation GPS.
QA/QC procedures to be applied:	The minimum mapping unit is 1 ha. The assessment of the mapping was carried out through data collected in the field using navigation GPS. Cloud areas were analyzed with images collected by orbital Synthetic Aperture Radar (SAR) of satellite Cosmo SkyMed, ScanSAR mode and dual polariozation (HH-HV).
Calculation method:	Shapefile of areas detected as unplanned deforestation was used for updating the Shapefile of Forest Cover Benchmark Map by map algebra operations.
Any comment:	PRODES Digital project: http://www.dpi.inpe.br/prodesdigital/prodes.php Further information on QA/QC available in: • <i>Câmara et al. 2006. Metodologia para o cálculo da taxa anual de desmatamento na Amazônia Legal</i>

Data Unit / Parameter:	Ctot
Data unit:	tCO ₂ e ha ⁻¹
Description:	Average carbon stock per hectare in all carbon pools in the Forest class used at baseline scenario.
Source of data:	Calculated by allometric equations, expansion factors from scientific literature, and data measured in the field by Jari Florestal.
Description of measurement methods and procedures to be applied:	Above-ground biomass estimate was carried out using forest inventory data, allometric equations developed in areas similar to the project area (HIGUCHI, 1998). And expansion factors developed by Nogueira et al. (2008) in sites of the Brazilian Amazon to estimate biomass of trees with DBH lower than 10 cm, palm trees, vines, non-tree components and dead above-ground biomass. Below-ground biomass was obtained using root-shoot ratio of 25.8% biomass of trees DBH > 10cm. Total biomass spatial estimate was obtained applying geostatistics techniques developed by Sales et al. (2007).
Frequency of monitoring/recording:	One year before harvest. At one, three and five-year intervals after the UPA harvesting.
Value monitored:	N/A
Monitoring equipment:	N/A
QA/QC procedures to be applied:	Further information on QA/QC available in: • <i>Plano de Manejo Florestal Sustentável-Amapá;</i> • <i>PA - MFS 001 - Gestão e Certificação Florestal - Distribuição e Seleção das Parcelas Monitoradas;</i> • <i>PA - MFS 001 - Gestão e Certificação Florestal - Implantação e Mapeamento de Parcelas;</i> • <i>PA - MFS 002 - Inventário Florestal 100%;</i> • <i>PA - MFS 003 - Gestão e Certificação Florestal - Parcelas Permanentes;</i> • <i>PA - MFS 015 - Gestão e Certificação Florestal - Monitoramento do inventário florestal 100%.</i>
Calculation method:	Comparison between total carbon stock average value contained in forest class used in the baseline scenario, according to <i>Estimativa do Estoque de Carbono Florestal para o Projeto REDD+ Jari/Amapá</i> and measures analyzed after the UPA harvesting.

Any comment:	Methodology VM0015 mandatory requirement for areas with logging. In this monitoring period not had carbon stock change due to planned logging activities in the project area.
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Data Unit / Parameter:	DBH
Data unit:	cm
Description:	Diameter at Breast Height (130 cm) for each tree with DBH equal or higher than 15cm in each plot of the forest inventory.
Source of data:	Calculated from the circumference at breast height measured in the field by Jari Florestal.
Description of measurement methods and procedures to be applied:	DBH is calculated from the circumference at breast height (CBH) data of each monitored tree measured in the field.
Frequency of monitoring/recording:	One year before harvest. In intervals of one, three and five years after the UPA harvest.
Value monitored:	N/A
Monitoring equipment:	Calculated from the circumference at breast height data measured in the field using a measuring tape.
QA/QC procedures to be applied:	Mandatory monitoring according to Methodology VM0015. Data coming from forest inventory collected in periods of up to 10 years from multiple plots. Further information on QA/QC available in: • <i>Plano de Manejo Florestal Sustentável-Amapá;</i> • <i>PA - MFS 001 - Gestão e Certificação Florestal - Implantação e Mapeamento de Parcelas;</i> • <i>PA - MFS 001 - Gestão e Certificação Florestal - Distribuição e Seleção das Parcelas Monitoradas;</i> • <i>PA - MFS 003 - Gestão e Certificação Florestal - Parcelas Permanentes;</i> • <i>PA - MFS 015 - Gestão e Certificação Florestal - Monitoramento do inventário florestal 100%.</i>
Calculation method:	DBH is calculated from the circumference at breast height (CBH) data of each tree monitored measured in the field.
Any comment:	Main variable used to estimate changes in carbon stock on the Jari/Amapá REDD+ Project. In this monitoring period not had carbon stock change due to planned logging activities in the project

	area.
Data Unit / Parameter:	Planned deforestation to build the FSC-certified Forest Management infrastructure
Data unit:	Hectare (ha)
Description:	Map of forest cover areas converted into non-forest areas due to the construction of FSC-certified forest management roads, trails and forest patios.
Source of data:	Remote sensing images, technical maps, and specific field cards to monitor the construction of FSC-certified forest management roads, trails and forest patios.
Description of measurement methods and procedures to be applied:	The monitoring of forest cover areas in the FSC-certified forest management area will be done by satellite images analysis, road, trails and forest patio construction maps, and field verification. In case planned deforestation occurs, the Forest Cover Benchmark Map will be updated by map algebra. The reduction in carbon stock in the Project area will be reported in the verification processes.
Frequency of monitoring/recording:	During the year of management of each UPA.
Value monitored:	N/A
Monitoring equipment:	Field card and geographic information system.
QA/QC procedures to be applied:	Further information on QA/QC available in: • <i>Plano de Manejo Florestal Sustentável-Amapá;</i> • <i>PA - MFS 006 - Planejamento Trilhas de Arraste;</i> • <i>PA - MFS 012 - Redução da Formação de Grandes Clareiras;</i> • <i>PA - Planejamento, Abertura e Manutenção de Estradas Florestais;</i> • <i>PA - MFS 021 - Monitoramento da Abertura de Estradas.</i>
Calculation method:	In case planned deforestation areas are detected the Forest Cover Benchmark Map will be updated by map algebra.
Any comment:	In this monitoring period not had carbon stock decrease due to planned deforestation in the project area.

Data Unit / Parameter:	$\Delta C_{abBSLLKt}$
Data unit:	tCO ₂ -e
Description:	Total carbon stock changes in the leakage belt area
Source of data:	Calculated.
Description of measurement methods and procedures to be applied:	- leakage prevention activities will be listed; - a map showing areas of intervention and type of intervention will be prepared; - areas where leakage prevention activities impact carbon stock will be identified; - non-forest classes existing within these areas in the baseline case will be identified; - carbon stocks will be measured on the identified classes or conservative literature estimates will be used; - carbon stock changes in the leakage management areas under the project scenario will be reported using table 30b of the VM0015; - net carbon stock changes that the leakage prevention measures cause during the fixed baseline period and, optionally, the project crediting period will be calculated; - results of the calculations will be reported in table 30.c of the VM0015.
Frequency of monitoring/recording:	To be determined depending on the activity
Value monitored:	0
Monitoring equipment:	To be determined depending on the activity
QA/QC procedures to be applied:	To be determined depending on the activity
Calculation method:	To be determined depending on the activity
Any comment:	N/A

Data Unit / Parameter:	Methane (CH₄) and nitrous oxidate (N₂O) emissions from livestock
Data unit:	tCO ₂ -e yr ⁻¹

Description:	Emissions from grazing animals in leakage management areas at year t
Source of data:	Reports from Fundação Jari and geographic information system
Description of measurement methods and procedures to be applied:	- Annual areas that have grazing activities in the leakage management areas will be specified; - Types of animal forage and manure management will be briefly described. Table 31 of VM0015 will be used to report the key parameters required to perform the calculation of GHG emissions; - The number of animals in the baseline case and under the project scenario will be determined based on available areas and forage. The difference will be considered for the calculation of the increase in GHG emissions; Methods described in appendix 4 of the VM0015 will be used to estimate emissions from enteric fermentation and manure management; final calculations will be done using equation 18 of the VM0015 and results will be reported in table 32 of the VM0015.
Frequency of monitoring/recording:	Annually
Value monitored:	0
Monitoring equipment:	Field spreadsheets
QA/QC procedures to be applied:	N/A
Calculation method:	Equation 18 of the VM0015 will be used.
Any comment:	N/A

3.3 Monitoring Plan

The Project's Monitoring Plan has two tasks: 1 Monitoring of carbon stock changes and GHG emissions for periodical verification; 2 Revisiting the baseline projections for future fixed baseline period. During this monitoring period only the Task 1 was carried out.

TASK 1: MONITORING OF CARBON STOCK CHANGES AND GHG EMISSIONS FOR PERIODICAL VERIFICATION

1. Monitoring of actual carbon stock changes and GHG emissions within the Project Area

Technical description of the monitoring tasks

The Project encompasses two components two components of activities that were monitored:

- i) the continuous monitoring of FSC-certified forest management activities prior to, during and after the FSC-certified forest management operations will be done by Jari Florestal specialized team, assessing the activities regarding operational, environmental and occupational safety aspects. Since project proponent are still waiting the SFM Plan final approval from IBAMA this component were not monitored yet.
- ii) the monitoring of the REDD+ activities aimed at avoiding unplanned deforestation through the intensification of premises, security and surveillance activities (increase in the frequency and comprehensiveness), the monitoring of the forest cover with satellite images and field survey, and social inclusion of the communities in the Jari/Amapá REDD+ Project area of influence.

Data collected and to be collected

Table 5. Data to be collected (regarding FSC-certified Management) and data collected (regarding REDD+ activities) to the monitoring plan.

Component	Data/Parameter	Description	Unit	Source	Frequency
FSC-certified Management	Training and qualification of workers	Training courses to qualify workers on the operational and environmental procedures related to their area of work, as well as other subjects such as Sustainable Management, Certification and Safety at Work.	Number of trained staff	Jari Florestal	Annual
	Permanent plots	Register of the implementation of the activity.	Status of implementation	Jari Florestal	Annual
	100% pre-harvest inventory or forest census	Register of the implementation of the activity.	Status of implementation	Jari Florestal	Annual
	DBH	Diameter at Breast Height (130 cm) for each	cm	Calculated from the circumference	One year before harvest. In

Component	Data/Parameter	Description	Unit	Source	Frequency
		tree with DBH equal or higher than 15cm in each of the forest inventory plot.		at breast height measured in the field by Jari Florestal.	intervals of one, three and five years after the UPA harvest.
	Storage patios and forest roads opening	Register of the implementation of the activity.	Status of implementation	Jari Florestal	Annual
	Felling of trees	Register of the implementation of the activity.	Status of implementation	Jari Florestal	Annual
	Logging, measurement and marking of the logs.	Register of the implementation of the activity.	Status of implementation	Jari Florestal	Annual
	Log skidding to storage yards	Register of the implementation of the activity.	Status of implementation	Jari Florestal	Annual
REDD+ activities	Income and expenses spreadsheet	Project's budget follow up	R\$	Biofilica Investimentos Ambientais	Annual
	Social activities	Social activities developed together with the communities in the Jari/Amapá REDD+ Project area of influence.	Number of benefited families	Fundação Jari	Annual
	AUDPA _{icl,t}	Areas of unplanned deforestation in forest class <i>ic/</i> at year <i>t</i> in the project area	ha	Calculated through remote sensing images.	Annual
	APDPA _{icl,t}	Areas of planned deforestation in forest class <i>ic/</i> at year <i>t</i> in the project area	ha	Calculated through remote sensing images, technical	Annual

Component	Data/Parameter	Description	Unit	Source	Frequency
				maps, and specific field cards.	
	$\Delta CPLdPA_t$	Total decrease in carbon stock due to planned logging activities at year t in the Project Area	tCO ₂ -e	Calculated	Annual
	$ACPA_{icl,t}$	Annual area within the Project Area affected by catastrophic events in class <i>icl</i> at year t	ha	Calculated through remote sensing images.	Each time a catastrophic event occurs
	$\Delta CUCdPA_t$	Total decrease in carbon stock due to catastrophic events at year t in the Project Area	tCO ₂ -e	Calculated	Each time a catastrophic event occurs
	$\Delta CUDdPA_t$	Total carbon stock decrease due to unavoided unplanned deforestation within the project area at year t .	t CO ₂ -e	Calculated	Annual

Overview of data collection procedures

3.3.1 Monitoring of project implementation

The monitoring of the implementation and execution of the FSC-certified forest management activities will be done according to Jari Florestal's procedures throughout all its phases and in all the aspects – operational, environmental and social – so as to meet FSC principles and criteria, once the SFM Plan is authorized by IBAMA, which didn't happen until this monitoring period. The implementation of REDD+ activities were monitored through physical-financial schedules, follow-up of performance and quality reports, social management reports, maps of forest cover, meeting reports, land invasion police reports and other actions to control illegal deforestation, and other relevant documents.

Data archiving

All data and reports of the Jari/Amapá REDD+ Project are stored by Biofílica Investimentos Ambientais in digital files throughout the project.

The original reports and field cards collected for the FSC-certified forest management activities will be stored by Jari Florestal. Biofílica Investimentos Ambientais will keep a copy of these documents filed in digital format throughout the project.

The compilation and announcement of the results of social activities are done through Fundação Jari Activities Report and Impacts Report periodically prepared and are made available in digital format.

All documents related to the monitoring of Jari/Amapá REDD+ Project will be put together in hard and/or virtual files, and made available to the verification body at each verification event.

Organization and responsibilities of the parties involved in all the above

Jari Florestal is responsible for implementing and monitoring activities related with the forest management activities and biodiversity monitoring. Fundação Jari and Biofílica are responsible for implementing and monitoring the social activities. Jari cellulose is responsible for supporting the surveillance activities. Biofílica Investimentos Ambientais is responsible for all GHG emission reductions calculations and monitoring and projects periodical verification. All activities of monitoring are a responsibility of Biofílica Investimentos Ambientais, Jari Florestal, Jari Celulose and Fundação Jari.

3.3.2 Monitoring of land-use and land-cover change

The monitoring of planned and unplanned deforestation was done through project area forest cover mapping using 30-meter or higher spatial resolution satellite images. The monitoring of the deforestation for implementation of FSC-certified forest management infrastructure will be carried out through specific field cards for the construction of roads, trails and forest patios inside the project area, and the maps and satellite images containing information on forest cover areas converted into non-forest areas. In order to have more flexibility in the deforestation mapping process, different techniques of automatic classification and visual interpretation of SAR images using field data and cartographic quality standards were used. Data on deforestation events was compared to baseline scenario. Emission reduction values for the monitored period were based on the comparison between forecasted and real deforestation

Data acquisition:

For the mapping of forest cover and land use was used images from the satellite Landsat and from the radar sensor TERRASAR-X. The Landsat images used was with spatial resolution equal to 30 meters and spectral resolution between 0,45 to 2,35 μm , within the period of lower incidence of clouds and rain in the region. The radar sensor used was acquired in the band X (3 cm). For the monitoring of forest cover in the monitored area all the satellite images covered the area between the following coordinates: 0°26'22"S/52°38'20"W and 1°3'40"S/52°8'12"W. All the data used to perform the monitoring, including maps in Shapefile and Geotiff format was provided by PRODES Digital of the National Institute for Space Research (INPE), the information provided

by PRODES Digital can be accessed at www.obt.inpe.br/prodes. Support data from SAR sensors and Google Earth was used just to validate the PRODES mapping.

Pre-processing:

The main activities regarding pre-processing were carried out by PRODES. The procedures were the following:

- Selection of optical satellite images with less cloud coverage, shooting date closer to Amazon dry season and adequate radiometric quality;
- Georeferencing of the satellite images with topographic charts in a 1:100,000 scale or NASA images in MrSID orthorectified format;
- All data was in Datum SIRGAS 2000;
- Generation of a spectral mixture model to estimate the percentage of vegetation, soil and shadow component for each pixel of the image;
- Application of the segmentation technique which identifies in the satellite image the spatially adjacent regions (segments) with similar spectral characteristics;
- Classification the segments to identify forest classes, non-forest vegetation and deforestation.

Classification:

The methodology of classification adopted by PRODES Digital is made by using the multispectral images to transform values from digital numbers to scene component (vegetation, soil and shadow) through spectral mixture algorithm. The classification is performed, for every year since 2000, using the algorithm unsupervised ISOSEG with the acceptance threshold of 90% for the classes: forest, deforestation, non-forest vegetation, hydrography and cloud. These segmentation and classification algorithms can be applied using the programs Spring and TerraView. In the case of this monitoring period was used de classification made for the years 2012 and 2013 (Câmara et al., 2006). For more information access: obt.inpe.br/prodes/metodologia.

Post-processing:

The methodology of classification is programmed to avoid the cloud coverage by selection of optical satellite images with less cloud coverage and by estimating the areas deforested under cloud coverage. The areas remained within the cloud cover were validated by visual interpretation of radar image.

Classification accuracy assessment:

PRODES mapping evaluation was carried out by comparison of each of the classes of the land-use and land-cover map (2012 and 2013) with a set of 53 points randomly distributed over the monitored area (Project Area and Leakage Belt). Reference data used come from the point

obtained by visual interpretation of images from SAR sensors with high resolution and with support from the Google Earth images.

Having the reference points and the land-use and land-cover map of the monitoring period, it was possible to evaluate the performance of the monitoring process by analyzing the confusion matrix (Table 4) as per Congalton (1999). The overall accuracy of the monitoring process for the land-use classes at the monitored area presented values above 80%.

Additional Procedure Implemented

Additionally to the predicted procedure explained in the Project Description Section 2.4 and 2.5, all the identified deforestation Polygons were checked in the field according with the following procedure, developed after Project Validation and first verification.

For each year in this monitoring period Biofíllica Investimentos Ambientais generated an Annual Deforestation Bulletin (for 2012 and for 2013). These Bulletins contained all the data, methodology applied and the results of Biofíllica's analyses of PRODES data, for the corresponding year, within the Project Area and the Leakage Belt. Maps were generated with all the deforestation polygons of interest (those inside the perimeter of Project Area and Leakage Belt) and the polygons coordinates were set in a table.

Grupo Jari, specifically the Surveillance Department, used the maps and coordinates generated to check in the field 100% of the deforestation polygons, reporting the deforestation cause, status of the area and the responsible (if it is possible to identify). If a deforested area that wasn't identified by Grupo Jari previously is identified, the surveillance staff applied their official work instruction ("Instrução de Trabalho – Fiscalização da Área Fundiária" item 4.1).

A spreadsheet with the checked deforestation points and photos taken on each point were sent back to Biofíllica, by the Surveillance Department. Biofíllica used this information to consolidate the Bulletin.

This additional procedure were developed as a manner to record every year land use and land use change information and support Project's GHG information system, independently of the occurrence of a VCS verification.

Quality control and quality assurance procedures:

In order to validate the information obtained from satellite images, the mapped data on deforestation occurrences was carried out through data collected in the field using GPS navigation. The minimum accuracy of the classification for the land use and land cover map is 80%. For cloud-covered areas, images from SAR sensors were used.

Data archiving:

The original (raster) and processed (vector) digital data from satellite images, coordinates, technical maps, field photos and cards was stored by Biofíllica Investimentos Ambientais throughout the project. Maps of infrastructure installation, satellite images and annual deforested areas reports will be made available to the verification body at each verification event.

Organization and responsibilities of parties involved:

Biofíllica Investimentos Ambientais is responsible for data acquisition, storage, processing, evaluation and reporting. Grupo Jari is responsible for the field checking and storage of surveillance procedures and reports.

3.3.3 Monitoring changes in carbon stocks

Within leakage management areas:

No areas were subject to planned carbon stock decrease in the leakage management areas in the project scenario.

Within the project area:

It is expected that ex ante carbon stock estimate for forest class does not change during baseline period. However, VCS Methodology VM0015 requires the monitoring of carbon stock in project area subjected to significant carbon stock decrease in the project scenario according to the ex ante assessment due to controlled deforestation and planned harvest activities, or areas subjected to unplanned and significant carbon stock decrease in the project scenario.

Total carbon stock change due to unavoided unplanned deforestation within the project area is calculates the following way:

$$\Delta CUDdPA_t = \sum_{y=1}^t \left(\sum_{icl=1}^{icl} AUDPA_{icl,y} * \Delta Ct_{icl,t-y} - \sum_{fcl=1}^{fcl} AUDPA_{fcl,y} * \Delta Ct_{fcl,t-y} \right)$$

Where:

$\Delta CUDdPA_t$ Total carbon stock change due to unavoided unplanned deforestation within the project area at year t.

$AUDPA_{icl,y}$ Area of unplanned deforestation in the initial forest class icl at year t within the project area in the project scenario.

$\Delta Ct_{icl,Ac}$ Carbon stock loss in the initial forest class icl at age of change Ac (# of years after LU/LC change).

$AUDPA_{fcl,y}$ Area of non-forest class fcl at time t within the project area post-unplanned deforestation in the project scenario.

$\Delta Ct_{fcl,Ac}$ Carbon stock gain in the final non-forest class fcl at Age of change Ac (# of years after LU/LC change).

In case there is significant reduction in carbon stock due to FSC-certified forest management activities, such reduction will be reported in the verification processes using Tables 29 of the VCS approved methodology VM0015 version 1.1.

Overview of data collection procedures:

Monitoring changes (reduction) in carbon stock will be done through forest inventory, measurement of Diameter at Breast Height (130 cm), for each tree with DBH equal or higher than 15 cm in each plot of the forest inventory. DBH is the main variable used to estimate carbon stock and changes in carbon stock on the Jari/Amapá REDD+ Project. The monitoring of carbon stock for FSC-certified forest management areas will be carried out through the installation and measurement of pre-harvest forest inventory permanent plots in each UPA. Each monitored plot will be measured after harvest at one, three and five-year intervals.

Quality control and quality assurance procedures:

Information about QA/QC is available in the following documents:

- PMFS – Amapá;
- PA – Gestão e Certificação Florestal - Implantação e Mapeamento de Parcelas;
- PA – Gestão e Certificação Florestal – Seleção e distribuição das parcelas;
- PA – Gestão e Certificação Florestal – Parcelas Permanentes;
- PA – Gestão e Certificação Florestal – Monitoramento do inventário florestal 100%.

Data archiving:

The original reports and field cards will be stored by Jari Florestal. Biofílica Investimentos Ambientais will keep a copy of these documents filed in digital format throughout the project. None information regarding forest management activities were storage once this activity didn't started. Spreadsheets, reports and other information and data regarding all GHG emission reduction and unavoided unplanned deforestation was stored by Biofílica Investimentos Ambientais. Spreadsheets, forest inventory and monitoring reports of the plots will be made available to the verification body at each verification event.

Organization and responsibilities of parties involved

Jari Florestal is responsible for implementing, reporting and monitoring all the activities regarding the planned deforestation under the project scenario. Biofílica Investimentos Ambientais is responsible for calculating the changes in the carbon stock and monitoring all emission reductions and unavoided unplanned deforestation.

3.3.4 Monitoring of non-CO₂ emissions from forest fires

Emissions due to biomass burning are not accounted in this project.

3.3.5 Monitoring impacts from natural disturbances and other catastrophic events

Decreases in carbon stocks and increases in GHG emissions due to natural disturbances or catastrophic events will be done through monitoring of forest cover by satellite using the same methods applied to monitoring forest cover in the project area (section 1.1.2). During this monitoring period impacts from natural disturbances and other catastrophic events **were not observed**.

The main activities carried out to collection and process data are:

- Selection of optical satellite images with less cloud coverage, shooting date closer to Amazon dry season and adequate radiometric quality;
- Georeferencing of the satellite images with topographic charts in a 1:100,000 scale or NASA images in MrSID orthorectified format;
- Mapping the affected forest cover areas.

Emissions due to natural disturbance or catastrophic events will be estimated by multiplying area of forest loss mapped by average forest carbon stock. In case there is significant reduction in carbon stock due to natural disturbance or catastrophic events, such reduction will be reported in the verification processes using Tables 25e, 25f and 25g of the VCS approved methodology VM0015 version 1.1.

Data archiving

All data and reports of the Jari/Amapá REDD+ Project are stored by Biofíllica Investimentos Ambientais in digital files throughout the project.

The original reports and field cards collected for the FSC-certified forest management activities will be stored by Jari Florestal. Jari Celulose will store all data regarding field monitoring of deforestation, including natural disturbances and other catastrophic events. Biofíllica Investimentos Ambientais will keep a copy of these documents filed in digital format throughout the project.

Organization and responsibilities of the parties involved in all the above

Jari Celulose and Jari Florestal are responsible for the field monitoring. Biofíllica is responsible for the GIS monitoring, the GHG emissions calculation and the periodic verification events.

2. Monitoring of Leakage

3.3.6 Monitoring of Leakage

Technical description of the monitoring tasks

The Jari/Amapá REDD+ Project was involve two monitoring activities of sources of leakage:

- i) Monitoring of decrease in carbon stocks and/or increase in GHG emissions associated with leakage prevention measure if the project proponents implement activities such as tree planting, agricultural intensification, fertilization, fodder production and/or other measures to enhance cropland and grazing land areas. If these activities cause reductions in carbon stocks and/or increase in GHG emissions in leakage management areas, such carbon stock changes and/or GHG emissions will be estimated by Fundação Jari and Biofilica Investimentos Ambientais technical staff. This case was not identified during this monitoring period.
- ii) Monitoring of forest cover in leakage belt through satellite images was performed by Biofilica Investimentos Ambientais and Jari Celulose technical staff.

Data collected or to be collected

Table 6. Data collected to leakage monitoring.

Data	Description	Unit	Source	Frequency
$\Delta CLPMLK_t$	Carbon stock decrease due to leakage prevention measures	tCO ₂ -e	Calculated	Annual
$EgLK_t$	Emissions from grazing animals in leakage management area at year t	tCO ₂ -e	Calculated	Annual
$ELPMLK_t$	Annual total increase in GHG emissions due to leakage prevention measures at year t	tCO ₂ -e	Calculated	Annual
$\Delta CBSLLK_t$	Total ex post carbon stock change at year t .	tCO ₂ -e	Calculated	Annual

Overview of data collection procedures

3.3.6.1 Monitoring of changes in carbon stocks and GHG emissions associated to leakage prevention activities

A reduction in carbon stocks due to activities carried out in leakage management areas did not occurred as no activities of agricultural improvement or management of grazing areas able to alter carbon stocks and increase GHG emissions as compared with baseline scenario in leakage management areas was implemented. However, if it is decided that such activities are necessary, then the ex ante carbon stock changes and GHG emissions associated to such activities will be estimated as per step 8 of the methodology VM0015, and if significant they will be monitored and data will be made available to the verification body at each verification event using Tables 30b, 30c, 31, 32 and 33 of methodology VM0015 version 1.1.

The following activities in leakage management areas could occasion a decrease in carbon stocks or an increase in GHG emissions:

- Carbon stock changes due to activities implemented in leakage management areas;

- Methane (CH₄) and nitrous oxide (N₂O) emissions from livestock intensification (involving a change in the animal diet and/or animal numbers).

According to the most recent version of the VCS Standard nitrous oxide (N₂O) emissions from nitrogen fertilization are considered always insignificant. Consumption of fossil fuels is considered always insignificant in AUD project activities and must not be considered.

The main activities carried out to collection and process data for monitoring of Carbon stock changes due to activities implemented in leakage management areas are:

- leakage prevention activities was listed;
- a map showing areas of intervention and type of intervention was prepared;
- areas where leakage prevention activities impact carbon stock will be identified;
- non-forest classes existing within these areas in the baseline case will be identified;
- carbon stocks will be measured on the identified classes or conservative literature estimates will be used;
- carbon stock changes in the leakage management areas under the project scenario will be reported using table 30b of the VM0015;
- net carbon stock changes that the leakage prevention measures cause during the fixed baseline period and, optionally, the project crediting period will be calculated;
- results of the calculations will be reported in table 30.c of the VM0015.

The main activities carried out to collection and process data for monitoring of Methane (CH₄) and nitrous oxide (N₂O) emissions from livestock are:

- annual areas that have grazing activities in the leakage management areas will be specified;
- types of animal, forage and manure management will be briefly described. Table 31 of VM0015 will be used to report the key parameters required to perform the calculation of GHG emissions;
- the number of animals in the baseline case and under the project scenario will be determined based on available areas and forage. The difference will be considered for the calculation of the increase in GHG emissions;
- methods described in appendix 4 of the VM0015 will be used to estimate emissions from enteric fermentation and manure management; final calculations will be done using equation 18 of the VM0015 and results will be reported in table 32 of the VM0015.

3.3.6.2 Monitoring of carbon stocks reduction and GHG emissions increase due to activity displacement leakage

Activity data for the leakage belt area was determined using the same methods applied to monitoring deforestation in the project area (section 1.2). If during the monitoring process a deforestation event higher than the expected for baseline scenario is identified in the leakage belt (not the case during this monitoring period), and such deforestation is attributed to deforestation agents from the project area, the losses in carbon stock will be accounted for and reported using Table 22c and 21d of VM0015 approved methodology version 1.1. Monitoring of carbon stock changes:

Procedures for collection data was done using the same methods applied to monitoring deforestation in the project area (section 3.3.2 and 3.3.2).

Monitoring of increases in GHG emissions:

Emissions due to forest fires are not accounted in the baseline.

Quality control and quality assurance procedures

Monitoring of carbon stock changes and GHG emissions associated to leakage prevention activities:

To be determined depending on the activity, if implemented.

Monitoring of carbon stock decrease and increases in GHG emissions due to activity displacement leakage:

Procedures for quality control and quality assurance was done using the same methods applied to monitoring deforestation in the project area (section 3.3.2 and 3.3.3).

Activity data for the leakage belt area was determined using the same methods applied to monitoring deforestation in the project area (section 3.3.2 and 3.3.3). If during the monitoring process a deforestation event higher than the expected for baseline scenario is identified in the leakage belt (not the case during this monitoring period), and such deforestation is attributed to deforestation agents from the project area, the losses in carbon stock will be accounted for and reported using Table 22c and 21d of VM0015 approved methodology version 1.1.

Total carbon stock change due to unavoided unplanned deforestation within the leakage belt area is calculates the following way:

$$\Delta C_{BSLLK_t} = \sum_{y=1}^t \left(\sum_{icl=1}^{icl} AUDLK_{icl,y} * \Delta C_{tot_{icl,t-y}} - \sum_{fcl=1}^{fcl} AUDLK_{fcl,y} * \Delta C_{tot_{fcl,t-y}} \right)$$

Where:

$\Delta CBSLLK_t$ Total carbon stock change due to unavoided unplanned deforestation within the leakage belt area at year t .

$AUDLK_{icl,y}$ Area of unplanned deforestation in forest class icl at year t within the leakage belt area in the project scenario.

$\Delta Ct_{oticl,Ac}$ Carbon stock loss in the initial forest class icl at age of change Ac (# of years after LU/LC change).

$AUDLK_{fcl,y}$ Area of non-forest class fcl at time t within the leakage belt area post-unplanned deforestation in the project scenario.

$\Delta Ct_{otfcl,Ac}$ Carbon stock gain in the final non-forest class fcl at Age of change Ac (# of years after LU/LC change).

Data archiving

The original reports and field cards are stored by Fundação Jari. Biofíllica Investimentos Ambientais will keep a copy of these documents filed in digital format throughout the project. The original (raster) and processed (vector) digital data from satellite images, coordinates, technical maps, field photos and cards are stored by Biofíllica Investimentos Ambientais throughout the project. Maps of annual deforested areas, satellite images and reports will be made available to the verification body at each verification event.

Organization and responsibilities of the parties involved in all the above

Biofíllica Investimentos Ambientais is responsible for data acquisition, storage, processing, evaluation and reporting. Grupo Jari is responsible for the field checking and storage of surveillance procedures and reports.

3. Ex post net anthropogenic GHG emissions reductions

3.3.7 Ex post net anthropogenic GHG emissions reductions

Technical description of the monitoring tasks

In the verification processes the results was presented using the Table 36 of VM0015 approved methodology version 1.1 together with spatial data (deforestation maps, when available).

Data to be collected

Data	Description	Unit	Source	Frequency
ΔREDD_t	Net anthropogenic greenhouse gas emission reduction attributable to the AUD project activity at year t	tCO ₂ -e	Calculated	Annual
VCU _t	Number of Verified Carbon Units (VCUs) to be made available for trade at time t	tCO ₂ -e	Calculated	Annual

Overview of data collection procedures

The number of Verified Carbon Units (VCUs) generated by the activities of Jari/Amapá REDD+ Project at years 2012-2013 and 2013-2014 were calculated using equation 19 and 20 of VM0015 approved methodology version 1.1.

Quality control and quality assurance procedures

All tasks and tools indicated in part 2 of VM0015 approved methodology version 1.1 were used to ensure that the data are adequate for verification process and number of VCUs are reliable.

Data archiving

All data and reports of the Jari/Amapá REDD+ Project were stored by Biofílica Investimentos Ambientais in digital files throughout the project. All documents related to the monitoring of Jari/Amapá REDD+ Project were put together in hard and/or virtual files, and made available to the verification body at each verification event.

Organization and responsibilities of the parties involved

This activity is a responsibility of Biofílica Investimentos Ambientais.

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

Total emissions in the baseline scenario for year 2012-2013 and 2013-2014 are 248.948,6 tCO₂e and 208.070,6 tCO₂e respectively as presented in **Table 6**.

Table 6 Total net baseline carbon stock change in baseline scenario in the Project area (table 21b of VCS VM0015)

Carbon stock changes per initial forest class <i>icl</i>				Total carbon stock change of initial forest class in the project area				Carbon stock changes per post-deforestation zone <i>z</i>				Total carbon stock change of post-deforestation zones in the project area				Total net carbon stock change of the project area	
ID _{icl} >	1	ΔCBSLPA _{icl,t}		ΔCBSLPA _{icl}				ID _{iz} >	1	ΔCBSLPA _{z,t}		ΔCBSLPA _z					
Name>	Forest	annual		cumulative				Name>	Zone 1	annual		cumulative				annual	
Project Year <i>t</i>	tCO ₂ -e	tCO ₂ -e		tCO ₂ -e				Project Year <i>t</i>	tCO ₂ -e	tCO ₂ -e		tCO ₂ -e				tCO ₂ -e	
2012-2013	256.111,5	256.111,5		516.842,6				2012-2013	7.162,9	7.162,9		10.839,2				248.948,6	506.003,4
2013-2014	218.065,7	218.065,7		734.908,2				2013-2014	9.995,0	9.995,0		20.834,2				208.070,6	714.074,0

4.2 Project Emissions

Emissions due to planned deforestation

No emissions associated to planned deforestation were developed in the Project area from 14 February 2012 to 14 February 2014.

Emissions due to planned logging activities

No emissions associated to planned logging activities were developed in the Project area from 15 February 2012 to 14 February 2014.

Emissions due to planned fuel-wood and charcoal activities

No emissions associated to planned fuel-wood and charcoal activities were developed in the Project area.

Removals due to carbon stock increase of planned activities

Carbon stock increase due to planned activities in areas that would be deforested in the baseline case was omitted.

Total ex post carbon stock decrease in the Project area

No carbon stock decrease associated to Project activities has occurred in the Project area from 15 February 2012 to 14 February 2014.

Emissions due to unavoidable unplanned deforestation

A total of 128 hectares of unavoidable unplanned deforestation was observed within the Project Area in this monitoring period.

Total of emissions related to unavoidable unplanned deforestation is 56.351,0 tCO₂e. (2012 and 13)

Emissions due to forest fires and catastrophic events

No emissions associated to forest fires and catastrophic events have occurred in the Project area from 15 February 2012 to 14 February 2014.

Ex post estimated net carbon stock change in the Project area

Total ex post estimated carbon stock change in Project area under the Project scenario in this monitoring period is presented in **Table 7**.

Table 7. Ex post estimated net carbon stock change in the Project area under the Project scenario (Table 29 of VCS VM0015)

Project Year t	Total ex post carbon stock decrease due to planned activities		Total ex post carbon stock increase due to planned activities		Total ex post carbon stock decrease due to unavoided unplanned deforestation		Total ex post net carbon stock change		Total ex ante estimated actual non-CO2 emissions from forest fires in the project area	
	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative
	$\Delta CPA_{dPA,t}$	ΔCPA_{dPA}	$\Delta CPA_{iPA,t}$	ΔCPA_{iPA}	$\Delta CUD_{dPA,t}$	ΔCUD_{dPA}	$\Delta CPS_{PA,t}$	ΔCPS_{PA}	$EBBBSL_{PA,t}$	$EBBPSP_{PA}$
	tCO ₂ e	tCO ₂ e	tCO ₂ e	tCO ₂ e	tCO ₂ e	tCO ₂ e	tCO ₂ e	tCO ₂ e	tCO ₂ -e	tCO ₂ -e
2012- 2013	0,0	0,0	0,0	0,0	44.423,3	58.100,0	44.423,3	58.100,0	0,0	0,0
2013- 2014	0,0	0,0	0,0	0,0	11.927,7	70.027,7	11.927,7	70.027,7	0,0	0,0

Non-CO₂ emissions from forest fires

Not subject to monitoring and accounting.

4.3 Leakage

One source of leakage was monitored: leakage due to displacement activity.

Leakage due to displacement activity was monitored by mapping forest cover change in the leakage belt. As defined in the VCS Methodology VM0015, deforestation above the baseline in the leakage belt area will be considered activity displacement leakage. Activity data for the leakage belt area was determined using the same methods applied to deforestation mapping in the Project area.

Total ex post estimated leakage

Ex post total net carbon stock changes in the leakage belt due to displacement of activity in this monitoring period are presented in **Table 8**. Leakage was calculated as the difference between the ex post and ex ante the assessment. As the result is <0, total ex post leakage was set to zero.

Table 8. Total net ex ante and ex post baseline carbon stock change in the leakage belt (Table 35 of VCS VM0015)

Project Year t	Total net carbon stock change of the leakage belt area		Total net carbon stock change of the leakage belt area		Total ex-post Leakage	
	$\Delta\text{CBSLLKt}$	ΔCBSLLK	$\Delta\text{CBSLLKt}$	ΔCBSLLK	$\Delta\text{CBSLLKt}$	ΔCBSLLK
	annual	cumulative	annual	cumulative	annual	cumulative
	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e	tCO ₂ -e
2012-2013	465.126,1	795.319,5	31.601,7	61.882,2	0,0	0,0
2013-2014	342.154,4	1.137.473,9	29.918,9	91.801,2	0,0	0,0

4.4 Net GHG Emission Reductions and Removals

The net anthropogenic GHG emissions reductions were calculated following the equation 19, equation 20 and equation 21 of VCS VM0015 version 1.1. The risk factor used to calculate VCS buffer credits (VBC) is 16,5%, as calculated in Non-permanence Risk Report. The calculated ex post GHG emissions reductions are presented in **Table 9**.

Table 9. Ex post estimated net anthropogenic GHG emission reductions and Verified Carbon Units (Table 36 of VCS VM0015).

Project Year t	Baseline carbon stock changes		Ex post project carbon stock changes		Ex post net anthropogenic GHG emission reductions		Ex post VCUs tradable		Ex post buffer credits	
	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative
	$\Delta\text{CBSLPAt}$ tCO ₂ -e	ΔCBSLPA tCO ₂ -e	ΔCPSPAt tCO ₂ e	ΔCPSPA tCO ₂ e	ΔREDDt tCO ₂ e	ΔREDD tCO ₂ e	annual VCUt tCO ₂ e	cumulative VCU tCO ₂ e	annual VCBt tCO ₂ e	cumulative VCB tCO ₂ e
2012-2013	248.948,6	506.003,4	44.423,3	58.100,0	204.525,3	447.903,4	170.778,6	372.782,5	33.746,7	75.121,0
2013-2014	208.070,6	714.074,0	11.927,7	70.027,7	196.142,9	644.046,3	163.779,3	536.561,8	32.363,6	107.484,5

5 ADDITIONAL INFORMATION

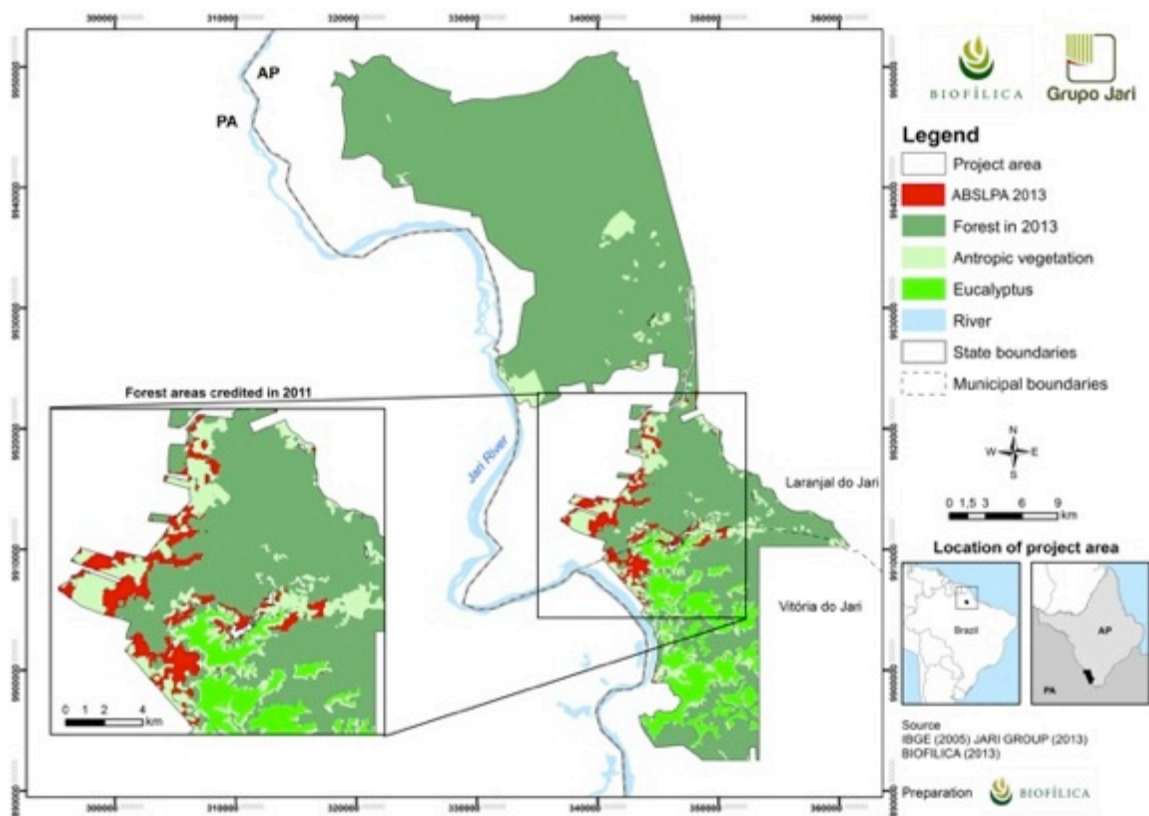


Figure 2. Map showing cumulative areas credited within the Project area.

Digital files used for the mapping (satellite images, shapefiles and GPS points) were presented to verification team as evidence of monitoring land-use and land-cover within the project area and leakage belt area.

6 ANNEX

Table 10. Complete table of FSC-certified Management Activities and their updated implementation status.

ACTIVITY	DESCRIPTION	APPLICABLE PROCEDURE	STATUS
1. Exploitation sizing activities			
1.1 Pre-harvest inventory	100% Pre-harvest inventory conducted in sample plots throughout the 200 thousand hectares of forest management area in order to support forest management planning by quantifying and qualifying forest resources determining the wood potential of the area through statistical sampling techniques.	PA-MFS 016 - Inventário Diagnóstico	Finished (concluded in 2011)
1.2 Property zoning	Macro and micro zoning of the forest management area for Forest Management Units (UPA, in Portuguese) delimitation, identification, classification and delimitation of the different classes of soil use, hydrography, landscaping, operational and non-operational areas, vines and other environmental aspects, and definition of the areas for the 100% Pre-harvesting Inventory.	Elaboração e revisão de plano de manejo florestal	Finished (UPA 01 macrozoning and micro zoning concluded in 2011; micro zoning of other UPA to be carried out throughout the operation cycle)
1.3 Definition of Forestry System and Production Regulation	Definition of forest management operational planning (cutting cycle, number of UPAs, volume of wood to be extracted, protected species to be managed and other operational aspects).	Elaboração e revisão de plano de manejo florestal	Finished (concluded in 2011)
2. Pre-management activities			
2.1 Implementation and mapping of the plots	Delimitation of permanent preservation, operation and non-operational areas. Determining the location of the plot for the 100% pre-harvest inventory.	PA-MFS 001 - Implantação e Mapeamento de Parcelas	Finished (concluded in 2011 for UPA 01; for other UPAs it will be carried out throughout the operation cycle)
2.2 100% pre-harvest inventory or forest census	Field measurement, identification, classification and location of the trees in the UPA for later processing of such information and defining the species and volume to be cut. It is the main instrument for the preparation of the Annual Operation Plans (POA, in Portuguese).	PA-MFS 002 - Inventário Florestal 100%	Finished (concluded in 2011 for UPA 01; for other UPAs it will be carried out throughout the operation cycle)
2.3 Implementation and measurement of permanent sample plots	Implementation and collection of data regarding the permanent plots, taking into consideration the relation of the existing species, number of trees per species and the quality of the species, in order to assess the impact on the	PA-MFS 003 - Parcelas Permanentes	Finished (concluded in 2011 for UPA 01; for other UPAs it will be carried out throughout the operation cycle)

2.4 Training and qualification of workers	Training courses to qualify workers on the operational and environmental procedures related to their area of work, as well as other subjects such as Sustainable Management, Certification and Safety at Work.	Sistemática de Treinamento	Finished (first activities concluded in 2011; it will be continuously carried out throughout the operation cycle)
3. Authorization Procedures			
3.1 SFM Plan submission	All information and data generated from 2006 to 2011 were consolidated on the Sustainable Forest Management Plan and submitted to IBAMA's appraisal, by Jari Group. IBAMA (www.ibama.gov.br) is the Brazilian Institute of Environment and Natural Resources is the responsible of approving SFM activities on Amapá State.	-	Finished Conducted from 2011 to 2012. Though the SFM Plan was submitted December 2011 a few additional information/documents were requested and provided to IBAMA during 2012.
3.2 SFM evaluation by the governmental authorized body	During this phase IBAMA evaluated the Sustainable Forest Management Plan submitted along with all additional information and documents provided by Jari Group.	-	Finished From 2012 to 2013 all SFM documents were under IBAMA's analysis.
3.3 Response to further information and corrections request	After IBAMA's evaluation further information/documents were requested, along with some corrective action and adaptations and clarifications.	-	Finished During 2013 and 2014 IBAMA's information, documents and corrections requested were addressed.
3.4 Stakeholders consultation	IBAMA also requested a stakeholders consultation to assess SFM Plan impacts on surrounding Protected Areas, specially Cajari Extrativist Reserve.	-	Finished Meetings and consultation were carried from 2013 to 2014.
3.5 SFM Plan Approval	Final approval of the Sustainable Forest Management Plan by IBAMA.	-	Ongoing Project Proponents are currently waiting for SFM Plan final approval.
4. Management Activities			
4.1 Planning, opening and maintenance of forest roads and bridges	Planning and execution of activities related to the opening and management of roads, bridges and manholes in the forest management area.	PA-Planejamento, Abertura e Manutenção de Estradas Florestais	Planned (start in 2016 for UPA 01; for other UPAs it will be carried out throughout the operation cycle)
4.2 Guided felling of the trees pre-selected for cutting	Guided felling of the pre-selected trees for cutting using tree felling techniques to diminish the risk of accidents, the formation of large clearings in the forest and the decrease of environmental impacts.	PA-MFS 004 - Derruba Direcionada de Madeira Nativa PA-MFS 012 - Formação de Grandes Clareiras	Planned (start in 2016 for UPA 01; for other UPAs it will be carried out throughout the operation cycle)
4.3. Logging of trees	Logging of trees to make their skidding to storage patios easier and using felling techniques to decrease the risk of accidents and reduce the impacts on the environment.	PA-MFS 005 - Traçamento de Madeira Nativa	Planned (start in 2016 for UPA 01; for other UPAs it will be carried out throughout the operation cycle)

4.4 Planning of skidding trails and storage patios	Planning of skidding trails and storage patios in the forest management operational areas based on felling techniques to decrease the risk of accidents and reduce the impacts on the environment.	PA-MFS 006 - Planejamento de trilhas de Arraste	Planned (start in 2016 for UPA 01; for other UPAs it will be carried out throughout the operation cycle)
4.5 Skidding the cut logs to the storage patios	Skidding and piling the logs in the forest management operational areas based on techniques to decrease the risk of accidents and reduce the impacts on the environment.	PA-MFS 007 - Arraste de Madeira Nativa	Planned (start in 2016 for UPA 01; for other UPAs it will be carried out throughout the operation cycle)
4.6 Manipulation and transportation of forest biomass (forest management residues)	Manipulation and transportation of forest biomass (forest management residues) from forest management operational areas to other areas and later use in energy generation using techniques to reduce environmental impact.	PA-MFS 008 - Preparo e Arraste de Biomassa Florestal	Planned (start in 2016 for UPA 01; for other UPAs it will be carried out throughout the operation cycle)
4.7 Transportation of logs and forest biomass	Loading, unloading and road transportation of logs and forest biomass.	PA-MFS 009 - Transporte de Madeira Nativa	Planned (start in 2016 for UPA 01; for other UPAs it will be carried out throughout the operation cycle)
5. Post-management activities (operational monitoring)			
5.1 Measurement of permanent plots	Measurement of trees and collection of data from the permanent plots taking into consideration the existing relationship between the species, number of trees per species and quality of the species in order to assess the impacts of the operation on the forest by monitoring its regeneration.	PA-MFS 003 - Parcelas Permanentes	Planned (start in 2017 for UPA 01; for other UPAs it will be carried out throughout the operation cycle)
5.2 Selection and distribution of the plots for operational monitoring	Distribution and systematizing of the plots where the monitoring of forest management operations will take place.	PA MFS 017 - Monitoramento da Derruba	Planned (start in 2016 for UPA 01; for other UPAs it will be carried out throughout the operation cycle)
5.3 Monitoring of the 100% pre-harvest inventory or forest census	Execution of the monitoring activities of the 100% pre-harvest inventory.	PA MFS 015 - Monitoramento do Inventário Florestal 100%	Planned (start in 2016 for UPA 01; for other UPAs it will be carried out throughout the operation cycle)
5.4 Monitoring of the storage patios and forest roads opening	Execution of the monitoring activities of the operational quality of storage patios and forest roads opening.	PA MFS 021 - Monitoramento da Abertura de Estradas de Colheita	Planned (start in 2016 for UPA 01; for other UPAs it will be carried out throughout the operation cycle)
5.5 Monitoring of felling of trees	Execution of the monitoring activities of the operational quality of the felling of selected trees.	PA MFS 017 - Monitoramento da Derruba	Planned (start in 2016 for UPA 01; for other UPAs it will be carried out throughout the operation cycle)

5.6 Monitoring of the logging, measurement and marking of the logs.	Execution of the monitoring activities of the operational quality of the logging, measurement and marking of the logs.	PA MFS 018-Monitoramento do Traçamento, Medição e Marcação de toras	Planned (start in 2016 for UPA 01; for other UPAs it will be carried out throughout the operation cycle)
5.7 Monitoring of skidding trails and storage yards planning	Execution of the monitoring activities of the operational quality of skidding trails and storage yards planning.	PA-MFS 016 - Monitoramento do Planejamento de trilhas de Arraste	Planned (start in 2016 for UPA 01; for other UPAs it will be carried out throughout the operation cycle)
5.8 Monitoring log skidding to storage yards	Execution of the monitoring activities of the operational quality of log skidding to storage yards.	PA MFS 019 -Monitoramento do Arraste de Toras	Planned (start in 2016 for UPA 01; for other UPAs it will be carried out throughout the operation cycle)
5.9 Monitoring of the manipulation and transportation of forest biomass (forest management residues)	Execution of the monitoring activities of the operational quality of the manipulation and transportation of forest biomass (forest management residues).	PA MFS 019 -Monitoramento do Arraste de Toras rev 4.doc e POMFS 019 -Monitoramento do Arraste de Toras	Planned (start in 2016 for UPA 01; for other UPAs it will be carried out throughout the operation cycle)
5.10 Monitoring of logging and forest biomass transportation	Execution of the monitoring activities of the operational quality of logging and forest biomass transportation.	POMFS0022 - Monitoramento do Carregamento e Transporte de Madeira	Planned (start in 2016 for UPA 01; for other UPAs it will be carried out throughout the operation cycle)

Table 11. Complete table of activities related with the REDD+ Component and their updated implementation status.

ACTIVITY	DESCRIPTION	STATUS/ CHRONOLOGY
1. Planning Activities		
1.1 Activities Planning Meeting	Proponents meeting for Project activities planning from its conception to validation and first verification.	Finished (concluded in 2011)
1.2 Survey of institutions and identification of partners	Survey and identification of local partners such as consultants, researchers and institutions to develop the Project.	Finished (concluded in 2011)
2. Development Activities		
2.1 Conducting Socioeconomic and Environmental Assessment (DSEA)	Study developed together with Arvorar Soluções Florestais and Instituto de Pesquisas Ecológicas (IPÊ) and 10 specialized researchers. The objective of the DSEA was to characterize the Project and surrounding areas in 4 modules (socio-economy, flora, fauna, and physical environmental aspects) and to conduct a preliminary assessment of possible impacts of the Project on local socio-economic and environmental context, as well as suggest monitoring measures based on scientific reports and articles already developed in the area.	Finished (concluded in 2012)
2.2 Carbon stock estimate	Study developed in partnership with Imazon aiming at estimating the forest carbon stock and producing a map of the carbon stock for the Project area based on data of forest inventories carried out in the FSC-certified Management component.	Finished (concluded in 2012). To be reassessed every 10 years (2021 and 2031), in order to revalidate Project's baseline.
2.3 Determination of the baseline and the carbon credits generation potential	It was also developed in partnership with Imazon aiming to determine the Project baseline and estimate the amount of REDD+ credits to be potentially generated by the Project.	Finished (concluded in 2012). To be reassessed every 10 years (2021 and 2031), in order to revalidate Project's baseline.
3. Management and conception design activities		
3.1 Carrying out a workshop to plan and design the Project.	Proponents and partners of the Project meet up to present the results of previous studies, identification of potential social and environmental activities to be developed	Finished (concluded in 2012)

	throughout the Project as well as definition of the Project monitoring actions.	
3.2 Carrying out stakeholder consultations	Meeting between project proponents and partners and State and local government agencies and other stakeholders (Instituto Estadual de Florestas, Secretaria de Estado do Meio Ambiente, Instituto de Desenvolvimento Rural do Amapá, Secretaria de Estado da Indústria, Comércio e Mineração, Secretaria Municipal de Agricultura de Vitória do Jari, Instituto de Desenvolvimento Rural, Secretaria Municipal de Meio Ambiente e Turismo, Instituto Federal do Amapá, Center for International Forestry Research), as well as the communities involved by the Project (Comunidades Fé em Deus, França Rocha, Tira Couro, Sombra da Mata, Ramal Valdomiro/Barbudo, Finished (concluded in 2012) PROJECT DESCRIPTION: VCS Version 3 v3.1 24 Instituto de Desenvolvimento Rural, Nova Conquista, Igarapé das Pacas and Água Azul) to present the Project design and its planned activities, collect suggestions, align expectations, open a communication channel and understanding of possible partnerships to be established.	Finished (concluded in 2012)
3.3 Consolidation of the Project management plan	The Project management plan consolidates the results of the studies carried out and the information on Project operation such as planning, management and monitoring.	Finished (concluded in 2012)
4. Validation/verification Activities		
4.1 Definition of applicable standard and methodology	Selection of the standard and methodology to be used for Project validation/verification.	Finished (concluded in 2011)
4.2 Preparation of the Project VCS description document	From the management plan the Project description document (Project Description) was prepared according to the criteria established by the VCS.	Finished (concluded in 2012)
4.3 Selection and contracting of validation agency and registration platform	Survey of validation/verification institutions accredited by the VCS and definition of the Project validation/verification bodies (VVB).	Finished (concluded in 2012)
4.4 Follow up of the audit process for validation/verification VCS	Audit to be conducted by the selected VVB.	Finished (concluded in 201)
4.5Preparation of document describing the Project on CCBS	From the management plan, it was prepared the Project description document (Project Description), according to the criteria established by CCBS.	Planned (started in 2015)

4.6 Selection and hiring of the validation body	Lifting validators institutions/verifiers accredited by CCBS, and definition of the validator organ and Project verifier (VVB).	Finished (concluded in 2014)
4.7 Support of the audit process for CCBS Validation	Audit to be conducted by the selected VVB.	Planned (started in 2015)
5. Activities Implementation		
5.1 Sustainable Forest Management, FSC-certified (Climate Benefits)	Design, implementation and monitoring of sustainable extraction activities of tropical timber in accordance with the best FSC practices. To be better explained in the following table (Table 8). There are 25 Annual Production Units (or UPA) planned to be harvested, one unit per year, until 2041. To every a UPA is to be harvested, the activities described in Table 8 shall be implemented in its area.	Planned to start in 2016. The SFMP proposed activities are to be developed during the entire project lifetime. Milestone: There are 25 Annual Production Units (or UPA) planned to be harvested, one unit per year, until 2041.
5.2 Monitoring of Deforestation	Evaluation of new deforestation areas through satellite images and generation of Annual Deforestation Bulletins. The deforestation monitoring is carried out every years according with the methodology described in the VCS Project Description. Biofilica evaluates every year the land use and land use changes within the monitored area (Project Area and Leakage Belt), based on PRODES/INPE data. Biofilica identifies every new deforestation polygon and send the coordinates to Grupo Jari (Surveillance department) that check them in the field in regard of area deforested, cause and responsible. Grupo Jari send the results of the field checking back to Biofilica and take the appropriate measures for each case.	In place since 2012. Continuously, during the entire project lifetime. Milestone: To be carried out every year.
5.3 Property Surveillance	The property surveillance program is based on terrestrial and fluvial regular patrolling. It aims to regularly and upon request monitor the areas under Grupo Jari responsibility and to watch the occurrence of illegal activities, such as invasions, illegal deforestation, illegal hunting, coming of outsiders and others. The program is	In place since 2003, but adapted in 2012 to incorporate REDD+ specific demands. Continuously, during the entire project

	prepared to receive denounce or surveillance request from any employee, community member or third-party. The surveillance will send a team to the area and check the situation. If any illegal activity, especially environmentally, is acted the surveillance team take coordinates and photos of it and communicates the Surveillance Manager and, depending on the case, the environmental responsible agency, through occurrence bulletins, reports an/or legal process, depending on the gravity of each case.	lifetime. Milestone: To check on the field every deforestation polygon. Identified by the annual deforestation bulletin. Excepting a few identified cases.
5.4 Technical Board Meetings	Regular articulation meetings and decision making with communities and stakeholders of the Project, regarding the social activities. These meetings aim to discuss general questions on the implementation of the Project and can also deal with special themes, such as land tenure issues and TARE. The proponents, Fundação Jari, the engaged communities, public agencies and other interested parties are members of the Technical Board.	In place since 2013. Continuously, during the entire project lifetime. Milestone: At least twice a year.
5.5 Technical Assistance and Rural Extension (TARE)	Technical assistance and rural extension service aims to work directly with producers to improve their technical and agro-extractive practices. In addition to production issues (directly linked with income generation). TARE is also concerned with the “social functions” of the land (directly linked to rural family welfare). TARE may incorporate several others sub-activities or work methodologies, such as workshops and trainings in agro-extractive techniques, development of property use plan (both explicated as different activities due to their importance), implementation of demonstrative units (DUs), and others.	In place since 2013. Continuously, during the entire project lifetime. Milestone: To attend at least 50 farmers every year. To attend personally each family at least once a month. Every 5 years, depending on the resources availability, attend 50% more farmers.
5.6 Workshops and training in agro-extractive techniques	Associated with TARE practices, courses ad training on specific topics can be taught according to the demands of producers. These focus mostly on productive issues, such as courses of açai seedling and cassava planting techniques.	In place since 2013. Continuously, during the entire project lifetime. Milestone: At least, to carry out one training per community per year.

5.7 Development of property Use Plans	Participatory methodology of mediation for the design of a strategic plan of use costumed for each family. It allows the producer to incorporate their “future plans” in the management of the property and encourages rural entrepreneurship. In this plans besides de rural productivity others aspects are also taken into account, such as social welfare and environmental conservation through the zoning of the property. It allows TARE to implement costumed actions, adapting alternative techniques to dreams and vocation of each producers and each property reality. The Property Use Plan is also integrated be analysis of the soil quality, in order to identify the best soil management practices and appropriate cultures.	In place since 2014. Continuously, during the entire project lifetime. Milestone: To develop a property Use Plan for every farmer attended, and to review it every 5 years.
5.8 Participatory Organizational Diagnosis (DOPs) and Community Development Plans	Participatory methodology to facilitate coordination with public bodies in the Technical Board. DOPs Workshops aim to participatively map communities relation with others institutions and organizations in order to understand their relation and need and to provide tactical inputs in the Technical Board (who should be necessarily invited or have the invitation reinforced, for instance). Community Development Plans are also made through a participative methodology and aims to identify communities’ most important needs and demands, developing and action plan to orientate Technical Board discussions topics.	Carried out with the currently engaged communities during 2013. Continuously, during the entire project lifetime. Milestone: To develop DOP and Community Development Plan for every new community engaged in the project and to participatory review them every 5 years.
5.10 Family Assessment	Survey of major socioeconomic information and welfare on a family level, conducted through direct interviews with families in order to monitor the impacts of the Project. Although it is a monitoring activity it is considered a Project Activity because for its execution Project staff has to designate appropriate resources, such as time, financial means and human resources, and it also has determined durability on time and milestones to be reached.	First carried out during 2014. Continuously, during the entire project lifetime. Milestone: To be carried out with all families attended by the Project, every 2 years.
5.9 Structuring of the socio-environmental Fund REDD+ Jari	After the selling out of the first credits vintage generated under the VCS GHG Program, at the end of 2014, an important strategic workshop was carried out between the project proponents and Fundação Jari to discuss how the resources should be invested. During this workshop it was deliberated tha 80% of the results would be reinvested in the project itself through guidelines and governance structure	To be implemented during 2016. Milestone: To be developed during 2015, first tested in 2016 and to have its final structure consolidated and under ongoing

	to be defined. During 2015 several meetings and workshops were realized with different departments of Grupo Jari (Surveillance and Infrastructure Department, Quality, Environment and Certification Department, Institutional Relations, Forestry Department, Research Department), Fundação Jari and the engaged communities. The main strategic lines of investments were defined as being Activities for Climate, Social Activities and Conservation, besides investments on project management and account maintenance. Those strategic lines contemplate all activities here described. Regarding governance it was established that the bank account should be hold by Fundação Jari, as an NGO, with the management of an executive committee formed by different departments of the proponents and the Technical Board as consultative/monitoring council of the executive committee decisions and actions implementations. A few operational details still need to be determined and approved by the involved parties. It is expected to be first tested in 2016, improved in 2017 and to be under ongoing operation after that.	operation until 2017.
5.10 Improvement of communication channels	There are already a number of mechanisms and communication channels such as newsletters from Grupo Jari and the “Acontece”, from Fundação Jari. These information channels discuss several themes such as education, fire control, water purification and waste management. There is also in place a feedback and grievance procedure implemented due to the FSC certification. The technical Board itself has also a very important communication importance. The project aims to adapt the communication practices already in place to the specificities of the REDD+ project, in order to develop a more efficient and broad communication mechanism.	Continuously, during the entire project lifetime. Milestone: To be more intensively thought, restructured and implemented during 2016 and 2017.
5.11 Biodiversity monitoring and scientific research	It consists in the long-term monitoring of Project impacts and sustainable forest management in the regional biodiversity, particularly through partnership with the universities and research institutions. Although it is a monitoring activity it is considered a Project Activity because for its execution Project staff has to designate appropriate resources, such as time, financial means and human resources, and it also has determined durability on time and milestones to be reached. It's also an important tool to monitor the environmental impacts the sustainable forest	Continuously, during the entire project lifetime. Milestone: Start in 2016. Assessment of species diversity and richness regarding flora, birds, mammals and dung beetle, to

	management activities. Regarding the Biodiversity strategy no active intervention is expected other than the monitoring of the ecosystem balance and the presence of endangered species, in order to compare the results with the without-project scenario.	be realized at least once every two years.
5.12 Seedling nursery	It is maintenance of a seedling nursery of native species from the region. Among them are endangered species and species of economic use by local communities, including Brazil nut, acai and cupuaçu. Besides conservation and production ends, those seedlings are also used to restore degraded lands.	Continuously, during the entire project lifetime. Milestone: To supply 100% of seedlings used by the project until 2021.
5.13 Xylotheque (wood collection) maintenance.	The wood collection of Jari Xyloteque was created in 1968 in order to preserve and increase knowledge on the Amazon forest heritage. It has 620 samples of wood from the area, a herbarium with 3,513 botanical samples and a collection of insects with 2,322 samples, which makes the Jari Xyloteque one of the largest in the world. The samples are collected by the botanical species identifiers and later catalogued under their common and scientific names and including some specifications such as density and size.	Continuously, during the entire project lifetime. Milestone: To have all its collection digitalized until 2021.
6. Management and Monitoring Activities		
6.1 Social and Environmental Management	Implementation of actions to generate positive social and environmental impact as described in the corresponding sections.	Started in 2011. Continuously throughout Project lifetime.
6.2 Permanent quality control	Monitoring of the implementation, efficiency and efficacy of social and environmental management. Includes periodical meetings with proponents, partners and people involved in the Project, as well as the continuous institutional articulation to identify and establish partnerships.	Started in 2011. Continuously throughout Project lifetime.

6.3 Monitoring of deforestation and emissions	The monitoring of benefits of the Project to climate, communities and biodiversity allows the establishment to use adaptive measures and adjust the activities of the Project.	Started in 2011. Continuously throughout Project lifetime.
6.4 Follow up of audit processes for verification	Audit to be periodically conducted by the selected VVB.	First verification performed in 2013; following verifications every 2 years.
6.5 Updating and complementation of the studies	Carrying out the necessary technical studies to develop Project activities throughout its duration and subsequent verification such as: review of baseline study, complementation of DSEA using current and/or primary data, updating of carbon stock estimate through new inventory data from the FSC certified Management, among other actions whenever necessary.	Started in 2011. Continuously throughout Project lifetime and at least every 10 years (2021 and 2031).

Table 12. Implementation chronology of micro activities related to the main activities of the Jari/Amapá project in the FSC-certified Management component (updated).

1 TO 2 YEARS BEFORE MANAGEMENT
Delimitation of Forest Management Unit (UPA, in Portuguese)
Delimitation of Work Units (subdivision of the UPA in blocks of 1,600 ha and plots of 10 ha)
Opening of trails
Micro zoning (creeks, vine areas, rocky formations, topography, among other aspects of the lands)
100% pre-harvest inventory or forest census – data collection
Cutting of vines
Implementation and measurement of permanent plots
Processing of 100% pre-harvest inventory data
Preparation of the Sustainable Forest Management Plan (SFMP)
Preparation of the Annual Operation Plan (POA, in Portuguese) – Annual Forest Management Plan
Planning of forest roads
Location of the gravel beds
Opening of main and secondary roads
Following authorization procedures under Governmental Agencies
Approval of the SFMP and the first POA
IN THE YEAR OF MANAGEMENT
Review of operational procedures
Training of workers involved in the operations (forest management, reduced impact, certification, operational procedures)
Construction of tertiary roads
Preparation of tree cutting maps (felling)
Cutting (felling) and logging of trees
Pre-planning of storage patios
Preparation of harvest maps including storage patios and skidding trails
Planning of storage patios and skidding trails
Skidding
Chain of Custody Control
Forest transportation (data bank daily supply)
Harvesting of forest residues (forest biomass)
1 YEAR AFTER MANAGEMENT
Silviculture treatment after harvest (when necessary)
Measurement of permanent plots to assess growth (forest recovery)
Maintenance of permanent infrastructure (roads, bridges and others)
2 YEARS AFTER MANAGEMENT
Maintenance services will take place every 5 years, or whenever necessary
3 YEARS AFTER MANAGEMENT
Measurement of permanent plots to assess growth (forest recovery)
5 YEARS AFTER MANAGEMENT
Measurement of permanent plots to assess growth (every 5 years after that)
24 YEARS AFTER MANAGEMENT – 1 YEAR BEFORE THE SECOND CYCLE
Maintenance of roads and patios
100% pre-harvest inventory (forest census)
25 YEARS AFTER MANAGEMENT – START OF THE SECOND CYCLE

Table 13. Implementation Chronology of the micro activities related to the Jari/Amapá REDD+ project main activities in the REDD+ component (updated).

1 TO 1.5 YEAR BEFORE THE VALIDATION AND FIRST VERIFICATION
Activities planning meeting
Coordination of institutions and identification of partnerships
Consolidation of activities time schedule
Carrying out the socioeconomic and environmental assessment
Carbon stock estimate
Determination of baseline and carbon credits generation potential
Feasibility studies of other environmental services
Workshop to plan and design the Project
Stakeholders consultation
Consolidation of Project design
Consolidation of management plan and drawing of Project description
Review and translation of Project description
Preparation of monitoring reports
IN THE VALIDATION AND FIRST VERIFICATION YEAR
Selection and contracting of validation/verification body and credit registration platform
Writing of validation/verification follow-up bulletins
Follow-up of the field audit
Registration of Project and credits
YEARS 2 TO 30
Implementation and monitoring of social activities with Fundação Jari
Articulation with local stakeholders
Implementation and monitoring of environmental activities
Monitoring of deforestation and emissions
Verification of credits (selection and contracting verification body; writing of follow-up bulletins, follow-up of the field audit, registration of credits)
Conduction of credit trading processes
Benefit sharing and reinvestment on Project's activities