THE ARC A/R PROJECT

4K Earth Science Private Limited

Project Title	The ARC A/R Project
Version	03
Project Location	State of Para, Brazil
Report ID	1901-VCS-CCB

Report Title	The ARC A/R Project
Client	Amazon Reforestation Consortium (ARC)
Pages	92
Date of Issue	06/12/2020
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Summary:

4K Earth Science Private Limited (4KES) was commissioned by Amazon Reforestation Consortium (ARC), to validate the project activity "The ARC A/R Project" in Brazil.

The purpose of the Validation is to confirm that 'The ARC A/R Project' and all related project documentation are in accordance with all rules and requirements of the VCS and CCB.

The VCS Standard v4.0, the applied GHG methodology "AR-ACM0003. Afforestation and reforestation of lands except wetlands. v2.0, its associated tools and the CCB Standard v3.1 are the criteria used to validate the Project.

The ARC A/R Project primary objective is to enhance forest cover through reforestation of 39,150 ha of degraded pasture land, enhance carbon sequestration potential and reduce greenhouse gases emission in the project area and help in socioeconomic development of the communities through job creation, capacity building and use of sustainable energy sources. The project area is a part of a critical region of the eastern amazon biome", which is located 300 km from Belem, the capital of Para state, Brazil.

During the validation process 03 clarifications, 26 corrective actions and 0 forward action request concerning CCB validation were raised.

In conclusion, it is 4KES's opinion that the project activity "The ARC A/R Project" in Brazil, meets all relevant requirements for VCS and CCB standards and guidelines, and correctly applies the methodology AR-ACM0003, Afforestation and reforestation of lands except wetlands. Version 2.0 and its associated tools for the calculation of baseline, for determining additionality and to monitor emission reductions through its entire crediting period between 01/01/2016 to 31/12/2045.

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1 INTRODUCTION

1.1 Objective

4KES has been contracted by Amazon Reforestation Consortium (ARC), to undertake the validation of the project activity "The ARC A/R Project" in Brazil" (which was under the VCS pipeline with ID PL1969).

The purpose of this validation is to have an independent third party assessment of whether the project activity conforms to the qualification criteria set out in the VCS Standard Version 4.0 on the basis of the project design.

In particular, the project's baseline, monitoring plan, and the project's compliance with relevant VCS requirements and host Country criteria are validated in order to confirm that the project design, as documented, is sound and reasonable and meets the identified criteria. Validation is a requirement for all VCS projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of Verified Carbon Units (VCUs).

1.2 Scope and Criteria

The validation scope is given as an independent and objective review of the project design, the project's baseline study and monitoring plan which is included in the VCS PD and other relevant supporting documents.

The scope of work covered in the validation is described below:

- To validate whether the project activity meets the requirements of VCS Standard v4.0, VCS Validation and Verification manual v3.2, VCS Program Guide v4.0 and CCB Standard v3.1
- To evaluate whether the baseline and monitoring plan are in conformance with the applied methodology from the VCS
- To confirm that the information presented are completed, consistent, transparent and free of omission or material error
- Background investigation and follow up interviews
- Issuance of draft validation report with CARs, CRs & FARs, if any
- Final validation opinion

4KES has performed validation based on a risk based approach focusing mainly on the significant risks to meet the qualification criteria and the ability to generate Verified Carbon Units (VCUs).

The validation is not meant to provide any consulting towards the client. However, stated request for clarifications and/or corrective actions may provide input for improvement of the project design.

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1.3 Summary Description of the Project

The ARC A/R Project primary objective is to enhance forest cover through reforestation of 39,150 ha of degraded pasture land, enhance carbon sequestration potential and reduce greenhouse gases emission in the project area and help in socioeconomic development of the communities through job creation, capacity building and use of sustainable energy sources. The project aims to re-establish animal corridors to help rebuild the bio-diversity that was lost during the past years due to deforestation. The project area is located 300 km from Belem, the capital of Para State, Brazil.

The proponent of the project is 'Amazon Reforestation Consortium' (ARC) and other party involved in the project is 'Transportadora Floresta do Araguaia Ltda' (TFA).

The other benefits of the projects are explained in the Section 2.2.1 of the PD. The summary is provided as below:

Climate Benefits: The increase in forest cover will help in sequestring an average of 5,35,286 tCO_2e per year and 16,058,589 tCO_2e in 30-year crediting period.

Community benefits: The project will build capacity and skill of the communities in the project area and help in additional livelihood generation. Also the project will provide cook stoves for the local population and conduct training on sustainable land use practices like agroforestry to conserve the native forest and increase tree cover. With the project implementation people will now have strengthened governance and forest management framework which will be in line of their traditional land management techniques and customs.

Biodiversity Benefits: The project will create of animal corridor, maintain forest cover and reduce habitat fragmentation. The project will ensure the conservation of threatened animal and plant species. The project also strengthens governance in and around the project area by employing security guards for forest protection.

2 VALIDATION PROCESS

2.1 Audit Team Composition (*Rules* 4.3.1)

The Competency Certificate of each of the Team Members is provided in the Appendix 3 of this report:

Mr. Ma Paa Puratchikkanal is the Team Leader for the project, he has over 24 years of experience in water, environment and energy sector projects. He has validated and worked as a Team Leader, Technical Expert and Technical Reviewer for more than 300 projects of CDM, VCS, WCD, Gold Standard Projects for various sectors & methodologies as per UNFCCC norms in various stages of Validation. He has been qualified as per the evaluation process of 4KES for competency for CDM/VCS/GS. He has worked with DOEs such as DNV, TUV Nord, TUV Rheinland and KBS.

Mr. Ewerton Alves has been working on the Forestry projects for in the country of Brazil. He is a Technical and Local Expert for sectoral scopes 14 in Country of Brazil and is a native local

language speaker, he has assisted the TL in meeting with the local stakeholders and assessing the requirements of the projects, especially those related to the land-owners, involved stakeholders.

Ms. Zainab Hassan has more than 8 years of experience and has primarily worked on Forestry Projects. She is Technical Expert for sectoral scopes 14. She has been qualified as per the evaluation process of 4KES for competency for CDM/VCS/GS. She has primarily worked on REDD+, VCS-CCB Projects. She has Strong exposure in developing and managing PES and Plan Vivo forestry and clean energy projects apart from CDM and VCS projects. She is skilled in developing REDD+ strategies and projects.

Mr. Narendra Kumar is the Technical Reviewer for the project and has more than 10 years of experience in the field of Energy, CDM, GS, VCS validation and verification. He has carried out validation & verification of GHG mitigation projects under various carbon market mechanisms such as CDM, VCS & Gold standard projects for DOEs TUV Nord, TUV Rheinland and KBS d. He has completed more than 100 projects has validator/verifier and technical reviewer and has been qualified as per the evaluation process of 4KES for competency for CDM/VCS/GS. He is a Energy Auditor Certified by Bureau of Energy Efficiency.

Ms. Sudha Padmanabha is a Technical Expert to the Technical Reviewer. She has more than 30 years of experience and is forestry expert, she has been qualified as Technical Expert in sector 14 as per the evaluation process of 4KES for competency for CDM/VCS/GS. She is a Technical Advisory Committee member for the forestry sector for Gold Standard panel for assessment of strategies and projects in forestry areas. She is also a RIT member for CDM projects with UNFCCC.

2.2 Method and Criteria

Validation was conducted using 4KES procedures in line with the requirements specified in the VCS Standard v4.0, VCS Methodology Requirements v4.0, the applied methodology "AR-ACM0003 Afforestation and Reforestation of lands except wetlands. v2.0," and its associated tools as well as applying standard auditing techniques.

The validation process is undertaken by validation team that involves the following:

- The desk review of documents and evidences submitted by the project proponent in context of the reference VCS rules and guidelines,
- Undertaking site visit, interview or interactions with the representative of the project proponent,
- Reporting audit findings with respect to clarifications and non-conformities and the closure of the findings, as appropriate and
- Preparing a draft validation report
- Resolution of outstanding issues and the issuance of final validation report and opinion

2.3 Document Review

The VCS Project Description submitted by Amazon Reforestation Consortium (ARC) and additional background documents related to the project design and baseline (i.e. VCS Project Description Template, Approved VCS methodology, Validation Requirements) as well as scientific literature and country law were reviewed in the light of VCS Standard v4.0 and CCB Climate, Community and Biodiversity Standards v3.1 rules.

All documents reviewed are referenced throughout the validation report as well as in validation findings in Appendix 1.

2.4 Interviews

The interviews were carried out with communities in the visit to the Project Zone 05/12/2019 to 08/12/2019. Validation team also visited the Project Proponent's (PP's) office during 29/10/2019. Below is a list of people interviewed.

Sr. No	Date	Name of the person	Role/Designation	Topic
1	29/10/2019	Mr. Micheal Greene	Director, ARC	VCS PD, Excel Sheets, VER calculations, financials, Project Roles and Responsibilities allocated, Ownership and project details. Sampling and ecological survey points for data collection.
2	29/10/2019	Ms. Daniela Gontijo	TFA Group	Mandatory licenses, Ownership and legal requirements, extent of forest coverage any Community participation and benefits.
3	29/10/2019	Mr. Vanderley de Oliveira	Groupa Dacko	Community participation, local coverage and stakeholder meetings. CCB Implementation. Any Grievances and how the assessment is done

				address the same.
4	29/10/2019	Dr. Evelise Pires	ARC	Baseline emissions, computations, leakage and project emission assessments
5	05/12/2019 To 08/12/2019	1. *Jones Santos De Cantuaria* 2. *Rogerio De Carvalho Coelho* 3. *Francisco Cleison Matos Santos* 4. *Rafael De Jesus Oliveria* 5. *Everaldo Silva Oliveria* 6. *Joao Batista Ezequiel Felomeno* 7. *Francisco Adilio Andrade Sousa* 8. *Jose Fabiano Gomes De Castro* 9. *Francisco Ailton Andrade De Sousa* 10. *Jose Aroldo Santos De Maria* 11. *Fabricio Pereira Silva* 12. *Gelsivan Da Silva Ferreira* 13. *Romario Sousa Borges* 14. *Antonio Alexandre Ribeiro De Souza* 15. *Flavio Ronei De Jesus Bezerra* 16. *Francisco Marques Da*	Stakeholder and community participants	Project stakeholders, owner issues, surrounding community benefits, participation, extent of implementation, continued progress scenario, non-project agricultural trainings and expectation from the project. Training programs provided, cookstove implementation, extent and future steps. Other general aspects and its addressal.

		Costa *17. Gilcigleibe Da Conceicao Silva* *18. Francisco Azevedo Santos* *19. Nildo Aleixo Da Costa* *20. Ramundo Charles Medeiros Da Costa* *21. Valmir Alves De Sousa* *22. Jose Pedro Da Silva* *23. Jamison Dos Santos Carneiro*		

2.5 Site Inspections

Duration of on-site inspection: 05/12/2019 to 08/12/2019	
No.	**Activity performed on-site** **Stakeholders and community interaction involved in checking and assessing on :**
1.	An assessment of the implementation and operation of the VCS project activity as per the submitted PD.
2	A review of information flows of the project design for generating, aggregating and reporting of the monitoring parameters.
3	Interviews with relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the Monitoring Plan
4	A cross-check between information provided in the PD and data from other sources
5	Stakeholder meetings, outcomes, issues, resolved issues, participation and expectations from the project. The benefits thereof and future scenario, awareness on these benefits.
6	A review of the project boundary, mapping pattern, calculations and assumptions made in determining the GHG data and ERs.

Describe the method and objectives for on-site inspections performed. Include in the description details of all project activity locations visited, the physical and organizational aspects of the project inspected and the dates when such site inspections took place.

2.6 Public Comments (*Rules* 4.6)

In accordance with the requirement in clause 3.16.5 of the VCS standard v4 “All VCS projects are subject to a 30-day public comment period. The date on which the project is listed on the project pipeline marks the beginning of the project’s 30-day public comment period”.

The PP listed their project activity in the VCS pipeline for 30 days from 29/10/2019 to 28/10/2019 (https://www.vcsprojectdatabase.org/#/ccb-pipeline-project-details/PL1969) /12/ for public comments.

No comments received during the commenting period, as evident from the VCS pipeline in the web interface

2.7 Resolution of Findings

As an outcome of the validation process, the team can raise different types of findings:

A Clarification Request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable VCS & CCB requirements have been met

Where a non-conformance arises the team leader shall raise a Corrective Action Request (CAR). A CAR is issued, where:

- The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions;
- The VCS & CCB requirements have not been met;
- There is a risk that emission reductions cannot be monitored or calculated.
- The validation process may be halted until this information has been made available to the team leader's satisfaction. Failure to address a CL may result in a CAR. Information or clarifications provided as a result of a CL may also lead to a CAR. No CL has been raised during the validation of the project activity.
- During the validation process, total 26 CARs and 03 CLs were raised and resolved satisfactorily. The list of CARs/CLs raised and the response provided, the mean of validation, reasons for their closure and references to correction in the relevant documents are provided in Appendix 2 of this report. Appropriate changes to the VCS PD v3 /10/.F

2.7.1 Forward Action Requests

A Forward Action Request (FAR) is raised during validation to highlight issues related to project implementation that require review during the first verification of the project activity. FARs shall not relate to the VCS requirements for registration.

No FAR has been raised during the validation of this project activity.

3 VALIDATION FINDINGS

3.1 Summary of Project Benefits

The unique Benefits of 'The ARC A/R Project' are summarized in table in Section 1.1 of the PD/10/ which are:

- Reforestation 39,150 hectares in the Amazon rainforest.
- Protection and building habitat for countless fauna and flora, reducing soil erosion and protecting watersheds present in the project area.
- The Project will manage the land as a private protected area, thus conserving local ecosystems through reforestation and will enhance ecosystem functionality by allowing patched of deforestation to regenerate thus eliminating ecosystem fragmentation.

- The medium term goal is to allow forest regeneration thus increasing the amount of carbon sequestered in the forest.

- With interventions like fuel efficient improved cookstoves, the project will have a potential positive impact on the overall community health especially women and children.

Based on site visit observation and interview with PP and stakeholders, the unique benefits considered for the project are found to be appropriate.

The standardized Benefits of 'The ARC A/R Project' are summarized in table in Section 1.1 of the PD/10/ and the assessment is provided as below:

Category	Metric	Estimated by the End of Project Lifetime	Section Reference
GHG emission or reductions removals	Net estimated emission removals in the project area, measured against the without-project scenario	N/A	
	Net estimated emission reductions in the project area, measured against the without-project scenario	16,272,128 tCO_2e	3.2.4
Forest[1] cover	For REDD[2] projects: Estimated number of hectares of reduced forest loss in the project area measured against the without-project scenario	N/A	
	For ARR[3] projects: Estimated number of hectares of forest cover increased in the project area measured against the without-project scenario	39,150 Hectares	3.2
land	Number of hectares of existing production forest land in which IFM[4] practices are expected to occurred as a result of project activities, measured against the without-project scenario	N/A	
Improved management	Number of hectares of non-forest land in which improved land management practices are expected to occurred as a result of project activities, measured against the without-project scenario	N/A	

[1] Land with woody vegetation that meets an internationally accepted definition (e.g., UNFCCC, FAO or IPCC) of what constitutes a forest, which includes threshold parameters, such as minimum forest area, tree height and level of crown cover, and may include mature, secondary, degraded and wetland forests (*VCS Program Definitions*)
[2] Reduced emissions from deforestation and forest degradation (REDD) - Activities that reduce GHG emissions by slowing or stopping conversion of forests to non-forest land and/or reduce the degradation of forest land where forest biomass is lost (*VCS Program Definitions*)
[3] Afforestation, reforestation and revegetation (ARR) - Activities that increase carbon stocks in woody biomass (and in some cases soils) by establishing, increasing and/or restoring vegetative cover through the planting, sowing and/or human-assisted natural regeneration of woody vegetation (*VCS Program Definitions*)
[4] Improved forest management (IFM) - Activities that change forest management practices and increase carbon stock on forest lands managed for wood products such as saw timber, pulpwood and fuelwood (*VCS Program Definitions*)

Category	Metric	Estimated by the End of Project Lifetime	Section Reference
Training	Total number of community members who are expected to have improved skills and/or knowledge resulting from training provided as part of project activities	40 families	4.4
	Number of female community members who are expected to have improved skills and/or knowledge resulting from training as part of project activities	15	4.4
Employment	Total number of people expected to be employed in project activities,[5] expressed as number of full-time employees[6]	30	4.4
	Number of women expected to be employed as a result of project activities, expressed as number of full-time employees	8	4.4
Livelihoods	Total number of people expected to have improved livelihoods[7] or income generated as a result of project activities	40 families	4.4
	Number of women expected to have improved livelihoods or income generated as a result of project activities	15	4.4
Health	Total number of people for whom health services are expected to improve as a result of project activities, measured against the without-project scenario	40 families	4.4
	Number of women for whom health services are expected to improve as a result of project activities, measured against the without-project scenario	15	4.4

[5] Employed in project activities means people directly working on project activities in return for compensation (financial or otherwise), including employees, contracted workers, sub-contracted workers and community members that are paid to carry out project-related work.
[6] Full time equivalency is calculated as the total number of hours worked (by full-time, part-time, temporary and/or seasonal staff) divided by the average number of hours worked in full-time jobs within the country, region or economic territory (adapted from the UN System of National Accounts (1993) paragraphs 17.14[15.102];[17.28])
[7] Livelihoods are the capabilities, assets (including material and social resources) and activities required for a means of living (Krantz, Lasse, 2001. *The Sustainable Livelihood Approach to Poverty Reduction*. SIDA). Livelihood benefits may include benefits reported in the Employment metrics of this table.

Category	Metric	Estimated by the End of Project Lifetime	Section Reference
Education	Total number of people for whom access to, or quality of, education is expected to improve as result of project activities, measured against the without-project scenario	20	4.4
	Number of women and girls for whom access to, or quality of, education is expected to improve as result of project activities, measured against the without-project scenario	10	4.4
Water	Total number of people who are expected to experience increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario	NA	
	Number of women who are expected to experience increased water quality and/or improved access to drinking water as a result of project activities, measured against the without-project scenario	NA	
Well-being	Total number of community members whose well-being[8] is expected to improve as a result of project activities	40 families	4.4
	Number of women whose well-being is expected to improve as a result of project activities	15	4.4
Biodiversity conservation	Expected change in the number of hectares managed significantly better by the project for biodiversity conservation,[9] measured against the without-project scenario	39,150 hectares	2.1.1
	Expected number of globally Critically Endangered or Endangered species[10] benefiting from reduced threats as a result of project activities,[11] measured against the without-project scenario	6	5.1

[8] Well-being is people's experience of the quality of their lives. Well-being benefits may include benefits reported in other metrics of this table (e.g. Training, Employment, Livelihoods, Health, Education and Water), and may also include other benefits such as strengthened legal rights to resources, increased food security, conservation of access to areas of cultural significance, etc.
[9] Managed for biodiversity conservation in this context means areas where specific management measures are being implemented as a part of project activities with an objective of enhancing biodiversity conservation, e.g. enhancing the status of endangered species
[10] Per IUCN's Red List of Threatened Species
[11] In the absence of direct population or occupancy measures, measurement of reduced threats may be used as evidence of benefit

Validation team checked section 1.2 of the PD/10/ and found that the section is completed appropriately. The estimated benefits are included and benefits that will not be monitored and/or are not applicable are labelled accordingly. Validation team also confirms that all achievements reported in the PD are substantiated with information provided in the body of the document.

CAR 01 was raised and was resolved successfully. Refer Appendix 2 for the same.

3.2 General

3.2.1 Summary Description of the Project (G1.2)

The Amazon Reforestation Consortium (ARC) project focus involving Reforestation of the degraded pasture land between the critical mass forest areas. It is set up by a consortium of like-minded groups including Grupo Dacko the largest Tree Nursery in the Amazon Biome producing 25 million trees per year and Transportadora Florestal do Araguaia Ltda. a large landowner, in the Municipality of Paragominas and the Municipality of Ulianopolis and the Municipality of Novo Esperanca do Piria and lastly the carbon consultant. These groups see the potential to reforest millions of hectares of the Amazon and help re-establish animal corridors to help rebuild the bio-diversity that was lost during the last 40 years, when more than half of the eastern Amazon was deforested.

This project area covers 39,150 hectares /14/ of Amazon forests and is located 300 km from Belem, the capital of Para State, Brazil. The project goal is to reforests 39,150 hectares of the degraded land. The start date of the project is 01/01/2016 which is the date of Memorandum of Understanding (MoU) signed between ARC and TFA (Land owner) /15/. Since this is the date of starting of plantation activities, considering the same as start date is appropriate.

As per PD /10/, the projects climate, community and biodiversity objectives are as below:

Climate Benefits: Furthermore, the increase in forest cover and sequestration of carbon in living biomass, will contribute to the reduction of greenhouse gas emissions by acting as sinks by sequestering an average of 5,35,286 tCO_2e per year, it is 16,058,589 tCO_2e whiting the 30-year crediting period.

Community Objective: The project also aims to empower women and communities and improve the access to, or quality of, education and health services as a result of project activities. The project has provided cook stoves for the local population and conducts bi-annual training on sustainable land use practice like agroforestry to conserve the native forests and diversify and improve livelihood.

Biodiversity Objective: Project has created the concept of animal corridor by the constructing the bridges for Capuchin monkey, which were very common in and around the project area but now to the increased rate of deforestation which are under threat and have been listed under IUCN's endangered species list. The project will provide habitat and protection for countless flora and fauna found in the rich biodiversity zone of the project area.

According to the VVB the project description is accurate, complete, and provides an understanding of the nature of the project.

CAR 02 and CL 01 was raised and was resolved successfully. Refer Appendix 2 for the same. Documents referred /10/ and /11/

3.2.2 Physical Parameters (G1.3)

The ARC A/R project is located in the northern part of the Brazil, State of Para, under three municipalities namely Nova Esperanca do piria, Paragominas and Ulianpolis (maps shown in 2.1.5 of the PD/10/). The project is developed on private properties which is made up of 3 separate blocks of land representing 53,528 hectares. Geographic coordinates of the project of the project area is as mentioned below;

a) North block - 2° 36' 0" S Latitude 47° 15' 0" W Longitude

b) Central block - 3° 17' 0" S Latitude 47° 12' 0" W Longitude

c) South block - 3° 48' 0" S Latitude 47° 18' 0" W Longitude.

The Climate, soil, hydrology, geology and land use of the area as well as the types as well as the distribution of the flora and fauna description in the PD were validated from the on-site observation, interviews and respective references given in the PD.

The validation team crosschecked the references such as KML files for coordinates /16/ and Rodrigues et al. (2013), EMBRAPA, 1988, Viera (1988), MMA, 2006, Mesner & Wooldridge (1964), Góes (1995), Del'Arco & Mamede (1985), Soares-Filho et al., 2006 and Laurance et al., 2001; Carvalho et al., 2002; Soares-Filho et al., 2006 /17/ for the physical and climatic parameters of the PA and found the details provided in the PD /10/ are correct.

Validation team finds the information in the PD /10/ is consistent with the observation of audit team and outcome of the interviews with local communities during the on-site visit.

CAR 03 was raised and resolved successfully. Please refer Appendix 2 for the same. Documents referred are /10//16/ and /53/.

3.2.3 Social Parameters (G1.3)

The social parameters described in the PD /10/ have been validated were validated from the on-site observation, interviews and respective references given in the PD.

The validation team crosschecked the references such as KML files /21/, State Law n. 3,225, dated 04-01-1965 /26/, State Law n. 5,087, of 09-14-1983 /22/, State Law n. No. 5,450, dated 05-05-1988 /23/, ARC marketing studies /24/, Participatory Rural Appraisal results /25/ and website (ibge.gov.br) /26/.

Validation team finds the information in the PD /10/ is consistent with the observation of audit team and outcome of the interviews with local communities during the on-site visit.

3.2.4 Project Zone Map (G1.4-7, G1.13, CM1.2, B1.2)

The boundaries of the Project Area and the Project Zone have been correctly indicated in the PD/10/ (Section 2.1.7). The accuracy of the project zone map was validated from the vertices in

the file Vertices_Glebas_Para.shp, downloaded from the INCRA (National Institute of Colonization and Land Reform) website (www.SIGEF.incra.gov.br) during site visit /27/.

The boundaries of the project activity are validated in section 3.3.3 of this report.

Positioning of communities was checked by visiting a sample of these during site visit. Hence, validation team concludes that this indicator has been correctly addressed in the PD.
CAR 04 was raised and resolved successfully. Documents referred /10//18//25//26//22//23//24//27//54/ and /62/

3.2.5 Stakeholder Identification (G1.5)

The PD provides an explanation of the process of stakeholder identification and analysis used to identify communities, community groups and other stakeholders.

Based on the IBGE"s 2010 Census data, PP identified the relevant stakeholders. PP identified the 18 community /23/ groups as stakeholders viz. N. Alianca; Novo Uniao; P. Araras; Paranoa; Resplendor; Agua Vermalha; V. Louro; Arapua; Escolinha; Vila 21; Piria; Gleba 22; Km 204; Beiradao; Sao Francisco; Sao Mateus; Sapucai; Vila Bom Jesus along with City of Paragominas and City of Ulianopols where the workers come from. PP also identified other stakeholders such as direct stakeholders, institutional stakeholders and commercial stakeholders.

Participatory rural appraisal (PRA) was performed in the project zone through a series of field visits, observations, surveys, workshops and interviews to local leaders and experts whom were informed about the project idea, its activities, the potential benefits to the communities and their participation in the project. The report of PRA and attendance list of meetings carried out were provided of the audit team, describing the process of stakeholder identification and its assessment. As can be seen from table in section 2.4 above, the VVB also met with 3 communities in the project zone directly involved in the activities of the project.

From the review of IBGE"s 2010 Census data /33/, PRA report /30/ and interview with communities, the validation team concludes that the stakeholder identification and analysis used to identify communities are found to be appropriate. Hence, the indicator has been correctly addressed in the PD.

3.2.6 Stakeholder Descriptions (G1.6, G1.13)

As mentioned above, based on the IBGE"s 2010 Census data, PP identified the relevant stakeholders. PP identified the 5 community groups as stakeholders that are also the direct beneficiaries of the project (mentioned in Section 2.1.9 of the PD /10/) viz.

1. Vila Sao Francisco

2. Vila Gleba 22

3. Vila Resplendor

4. Vila Sapucai and

5. Vila Km 204

. PP also identified other stakeholders such as direct stakeholders, institutional stakeholders and commercial stakeholders.

Based on the review of IBGE"s 2010 Census data /28/, onsite observation and interview with communities, the validation team concludes that the all the relevant stakeholders are correctly identified. Hence, the indicator has been correctly addressed in the PD.
CAR 04 was raised and resolved successfully. Documents referred /10//18//28//54/and /62/

3.2.7 Sectoral Scope and Project Type

The sectoral scope of the project is correctly identified in the PD as Sector Scope: 14 Agriculture, Forestry and Other Uses of the Land (AFOLU) and a ARR category project /2/ and /4/ as its objective is to enhance carbon sequestration and biomass in the private forest area through reforestation through communities engagement that will make it feasible. For this the PP correctly chose AR-ACM0003 A/R Large-scale Consolidated Methodology: Afforestation and reforestation of lands except wetlands Version 02.0.

- The project estimates and monitors carbon sequestered through reforestation activities in the project area that would remain as degraded land in the baseline.
- The project is a large scale A/R project
- The land subject to the project activity does not fall in wetland category.
- The soil within the Project boundaries is not an organic soil soils and are not subject to any of the land management practices

Hence, the choice of using methodology AR-ACM003 V.2.0 /4/ is justified.

3.2.8 Project Activities and Theory of Change (G1.8)

The climate benefits have a causal relationship with the enhancement of forest cover of an estimated 39,150 ha. The actions described Section 2.1.11 and in table 6 of the same Section of the PD /10/, which will be implemented to implement the project. The major actions planned and implemented under the project are:

Recover and regenerate degraded land: This will achieved through reforestation of 39,510 ha of land and allowing forest regeneration. This will help in CO_2 sequestration, generation of new habitats for biodiversity, biodiversity enhancement and protection, increase in quality and quantity of forest cover, restoration of landscapes.

Capacity building and training: This will help in better understanding of the importance of protecting the forest and how forest conservation will benefit their livelihoods and will provide opportunity to develop local businesses through an external fund. This will also help in minimizing the illegal activity and enhance the protection.

Improve local livelihoods for villagers: This will help in diversification of livelihood as well as food production through agroforestry practices. The activities will result in improvement in provision of local nutrition and also promote more efficient technologies to produce farinha and

reduce time consumption. This activity will improve agricultural practices, enhanced soil nutrition & quality and promote income from other activities like agroforestry.

Improve education: this will be achieved through improvements in the school infrastructure and organizing workshops. This will help in empowerment of communities through improvement in knowledge and skills, enhanced access to information and communication.

Improve health: This will be achieved through distribution of improved cook stoves to households to reduce use of firewood which will improve indoor air quality in households. This will also help reducing drudgery of women and children who walk long distances to collect firewood.

Improve biodiversity: The project will construct Monkey Bridges, which will help in conserving the endangered species of Cupuchin monkeys and also help in increasing the other endemic species of fauna and flora. Apart from increasing the tree biomass in the area through afforestation, this project activity will also help in improving the biodiversity in the project area.

Based on the review of PRA report /25/, on-site observation and interview with PP and stakeholders, the validation team confirm that all the activities suggested in table 6, section 2.1.11 of the PD is feasible.

The validation team concludes that the theory of change provided in the PD /10/ is accurate, complete, and provides an understanding of the nature of the project and how it will achieve its climate, community, and biodiversity objectives.
CAR 05 was raised and resolved successfully. Documents referred /10//9//15/ and /59/

3.2.9 Sustainable Development

In section 2.1.12 of the VCS PD, the PP has provided the sustainable development contributions of the project. PP claims the following sustainable development contributions:

No Poverty (SDG 1): The project provides new productive alternatives to the small holders and increasing the productivity of their current activities which reduces the poverty among the communities. Also activities such as improving pastures and promoting agroforestry will improve the productivity of the communities and thereby reducing poverty.

Quality Education (SDG 4): by improving school infrastructure and providing skills and capacity building trainings the project aims to build quality knowledge and increase awareness among the children and youths of communities of the project area.

Gender Equality (SDG 5): The project ensures gender equality by employing women as well as men without any restrictions.

Decent Work and Economic Growth (SDG 8): The project aims to generate decent employment and currently, ARC, Dacko Nursery and TFA has created approximately 30 full time positions, thus the project is promoting economic growth in the region.

Climate Action (SDG 13): The project activity aims to sequester 16,272,128 tCO_2e over 30 years.

Life on Land (SDG 15): the project restore the degraded pasture 39,150 ha land by reforestation and protection activities. Furthermore, the project is looking for the reconnection of monkey

corridors in Latin America as it is an endemic species, which means it is an indicator of biodiversity conservation level.

The VVB confirms that through the validation process it became confident that the PP correctly chose the Contribution to the UN Sustainable Development Goals /30/ it will help to achieve. These are listed in Section 2.1.12 of the PD.
CAR 06 was raised and resolved successfully. Documents referred /10/ and /30/

3.2.10 Implementation Schedule (G1.9)

In section 2.1.13 of the PD the PP identifies the key milestones for the project activity. Below are some of the milestones considered by the VVB and the way they have been validated:

Date	Milestone(s) in the project's development and implementation	Validation team assessment.
1st January 2016	Project start date	The MoU signed between ARC and TFA (Land owner) /20/ has been verified and found that the date mentioned in the PD is consistent with the MoU date. Since the date of signing of the MoU is the date of starting date of implementation of project activities, the start date considered for the project is appropriate.
25th June 2016	Consultative meetings with communities – introduction of project aims and requirements	The meeting report is verified and found to be OK /31/.
3rd August 2016	Climate change adaptation workshop and presentation of climate change analysis.	The workshop records /32/ are verified and found to be OK.
21st January 2017	Implementation of biodiversity monitoring plan	The implementation records /33/ of biodiversity monitoring plan is verified and found to be OK.
28th June 2017	Stakeholder's meeting to complete local stakeholders consultation process for VCS and CCB requirement	The stakeholder consultation /34/ report is checked and found to be OK.
10th May 2018	Resource Management Plan completed and signed	The Resource Management Plan /35/ is checked and found to be OK.
17th November 2018	Completion of data collection work and survey for VCS PD	All the survey data /36/ is verified and found to be OK.
3rd March 2019	Completion of PD	The date of initial PD /10/ is

		checked and found to be OK.
1st June 2019	Start of Validation and Verification of project activities	Validation and Verification happened simultaneously. The evidences and supporting documents provided reviewed and was found accurate.
2019 onwards (Until the end of December 2045).	Operationalize the project implementation plan (30-year work plan) include the monitoring plan of climate, community and biodiversity. - Development and monitoring of environmental and social management activities a. Child and women education annually b. Environment and forest trainings annually c. Training on social behavior and capacity building annually - Monitoring of deforestation and emissions a. Annual seminar on carbon and forestry projects b. Project site visit for the community members annually c. Training on deforestation and forest fire techniques annually - Monitoring of biodiversity (Fauna and Flora) - Survey of Capuchin Monkey population and other rare species of flora and fauna and documentation of the same for every 3 years. - Development of scientific research a. Training on agro-forestry	The Standard Operating Procedures (SOPs)-Monitoring - ARC AR Project /14/, Biodiversity monitoring plan /38/ and Resource Management Plan /40/ checked and found to be OK. Also, the plans during the project lifetime were discussed with the Project Management Team are in accordance with the VCS ARR practices.

	techniques for every 2 years b. Bee-hive cultivation for honey around the communities, which will be monitored for every 6 months after the registration of the project under VERRA. - Verification of credits (Selection and contracting of verification body; Production of follow-up bulletins for Verification Project; Monitoring of field audit; Registration of credits): Depending on the sale of VCUs and market conditions project verification will be conducted for every 2 years or 3 years or even 5 years. Crediting period renewal and baseline updating will be done for every 10th year of the project crediting period renewal during re-validation process. - Conducting of credit marketing processes	

3.2.11 Benefits Assessment and Crediting Period (G1.9)

The starting date of the Project crediting period is the same as the starting date of the project activity i.e., 1st January 2016. The end of the crediting period will be 31st December 2045 (30 years crediting period). The crediting periods for VCS and CCB are the same
CAR 07 was raised and resolved successfully. Documents referred /10/ and /15/

3.2.12 Risks to the Project (G1.10)

A comprehensive risk assessment to the climate aspect of the Project is validated in section 3.3.10 of this report.

Table 7 of the PD lists 8 main risks and what will be done to mitigate it which are assessed as below:

Risk	Assessment of Measure
Non continuity of the project activities	The project is backed by reforestation agreements signed by the owners voluntarily under prior and informed referring to the benefits and commitments to engage in VCS CCB strategy. The validation team checked the agreement and found that the owners are committed to reforest the productive systems implemented in their properties. As per the agreement, if a beneficiary want/must to sell the land, he/she may transfer the commitments and benefits to the new land owner; it will favor the permanence of project benefits regardless the changes in

	ownership. It also ensures that even policy changes should not affect the conservation program of the project area. The project has also ensured active participation of the community in the project management in every phase. Hence the Validation team finds that the mitigation measures provided by PP are adequate for the risk.
Invasion of project land by outsiders	The project has implemented regular patrols, signage, purchasing of more vehicles to conduct patrols, increasing awareness of community members about conservation and the rules of the resource plan, strengthening and authenticating land rights Validation team finds that the measures provided by PP are adequate to mitigate/reduce the risk.
Climate change /drought	Reducing deforestation and increasing green cover by afforestation activities – reduces carbon emissions and creates a better local ecosystem. Also PP proposes diversification of livelihood sources to reduce reliability on livestock which will reduce the impact of climate change/draught over communities. Validation team finds that the measures provided by PP are adequate to mitigate/reduce the risk.
Weak leadership /governance	The project provides leadership training and capacity building activities for the community leadership and village leadership teams, measures to increase transparency around income and expenditure of funds as mitigation measures. Validation team finds that the measures provided by PP are adequate to mitigate/reduce the risk.
Limited allocation of income	As described in PD, most of the project activities are designed to reduce the maintenance costs and/or increase the profitability of the systems. Also, the land owners are trained along with the implementation of the activities, in order to enable that subsequently, the activities can be developed by themselves. The same is confirmed though interview with PP and verification of sample training records. Validation team finds that the measures provided by PP are adequate to mitigate/reduce the risk.
Lack of budget for implementation of activities and / or project monitoring	As described in PD, most of the project activities are designed to reduce the maintenance costs and/or increase the profitability of the productive systems. Also, the land owners are trained along with the implementation of the activities, in order to enable that subsequently, the activities can be developed by themselves. ARC has an extensive trajectory in implementing projects with rural communities (especially in the project region) related to forest conservation and productive alternative systems. Based on the interview with PP and checking the track records of Amazon Reforestation Consortium, the validation team confirms the same. Therefore, this risk is mitigated based on its certified experience and

	management and mobilizing resources capacities at the country and international level. Validation team finds that the measures provided by PP are adequate to mitigate/reduce the risk.
Forest fires and other threats	As per interview with PP, the PP has confirmed that the land owners are trained by ARC in order to perform the technical tasks in an appropriate manner. As per discussion with monitoring team validation team also confirms that the ARC conducts regular visits to the properties which allow them to monitor as well as identify potential risks. This will reduce the risk of forest fires and other threats Validation team finds that the measures provided by PP are adequate to mitigate/reduce the risk.
Policy change by local governments	The policy change by local government against the project activity is unlikely as it is on the private land and if any change happens also will be inclined towards the project development positively.

PP has identified all relevant risks of the projects and the mitigation measures provided for each risk is adequate to minimize/mitigate the relevant risks. /5/ and /10/.

3.2.13 Benefit Permanence (G1.11)

In order to maintain and improve the benefits for the climate, community and biodiversity for the duration of the Project and beyond the lifetime, the PP is taking the following measures:

- Improvement in patrimonial surveillance procedures: through the provision of additional tools such as remote monitoring of high-resolution satellite images, acquisition of support equipment, and provision of training to the patrimonial surveillance team. The robust monitoring and reporting will help maintaining the long-term climate, biodiversity and community benefits.

- Socioeconomic development through increasing and building capacity for market linkages for agricultural and other extractive products. The Project aims to guarantee the long-term maintenance of the benefits generated, from the generation of autonomy and social empowerment to seek access to public services and the articulation of partnerships, providing financial and productive independence of the cooperatives and associations involved.

- Conduct capacity building and training within the communities and land owners on agroforestry and agricultural techniques, fire controls and environmental education actions on garbage care and cleaning & maintenance of watercourses. The PP aims to build the capacity of the communities which helps them to implement improved agricultural and forestry practices, produce adequate food, understand the requirements and knowledge of market linkages to sell their products and diversify and generate livelihood opportunities.,

- Creating monkey corridors by the construction of bridges for Capuchin monkey, which are under threat and have been listed under endangered species under IUCN's endangered species list

- Strengthening of the ARC and TFA Group: based on the consolidation of organization's activities, with the implementation of a qualified and sufficient technical team to serve sustainability. It is hoped that at the end of the project, ARC will consolidate itself as a business-promoting institution based on sustainable productive chains,

- In addition to providing for the reforestation for the maintenance of the forest cover, supporting the activities of responsible forest exploitation and providing tools to provide sustainable socioeconomic development, the Project has as its axis of action the incentive for scientific research on biodiversity and maintenance of high conservation value attributes. In this way, the Project will implement a long-term monitoring plan for Biodiversity and HCVs. These monitoring will aim to evaluate impacts, to implement mitigation actions and to increase the scientific understanding of Biodiversity in the region.

- Reframing and reinvigorating the resource plan community understanding of the potential for forest conservation to create and maintain native forest.

- The project revenue and livelihood improvement in the area will support and strengthen the existing schooling system. The increase in income of families in the project area will also limit the necessity of child labor. The PP will achieve this through participatory resource mapping in the project area.

- PP will provide health services via medicines deposit; which helps in the improvement of the access to health. First aid kit are kits are given (and annually renewed) to each field agent with first aid material and medicines for most common disease of the area in order to be able to treat first signs of disease before reaching a health center. All workers benefit from health insurance and mutual that can cover all their health costs, this will support them even after the project lifetime.

VVB through validation of the above measures and through interview with PP & stakeholders, confirms that the measures included in the PD /10/ to maintain and enhance the climate, community, and biodiversity benefits beyond the project lifetime is adequate.

3.2.14 Financial Sustainability (G1.12)

Through its extensive experience ARC group has developed an operational and management capacity to manage potential contributors (both private companies and donors) such as local Brazilian companies, which will be part of the project leverage. The PP has raised funds and invested the same in the project implementation activities including community capacity building on technical issues and monitoring for the first years. It will allow that subsequently, the activities can be developed by the land owners and the project's climate, community and biodiversity benefits can be achieved, without depending on additional funds that might be obtained in the future.

Furthermore, the Project has projected revenues from GHG emissions reductions. This has been validated in detail in section 3.3.5 of this report. Actual and projected flow of funds for project implementation and to achieve the project's climate, community and biodiversity benefits has been detailed in section 2.1.20 of the validated PD.

3.2.15 Grouped Projects

This is not a grouped project.

3.2.16 Land-Use Scenarios without the Project (G2.1)

This has been validated in depth in section 3.3.4 of this report.

3.2.17 Most-Likely Scenario Justification (G2.1)

This has been validated in depth in sections 3.3.4, 3.3.5, 3.4.4, 3.5.4 of this report.

The most likely land-use scenario described on those sections, with development which leads for grazing and expansion of the agricultural frontier; all these activities are practiced traditionally for their survival which gives continuity to management practices that generally are detrimental to natural resources.

3.2.18 Community and Biodiversity Additionality (G2.2)

This has been validated and detailed justification is given in section 3.3.5 of this report. The section justifies that without the support of carbon benefits the project is not viable and the business as usual (BAU) scenario will continue.

CAR 09 was raised and resolved successfully. Refer Appendix 2 for the same. Documents referred /10//11//25//36/ and /53/

3.2.19 Stakeholder Access to Project Documents (G3.1)

The access of project documents to the stakeholder is described in section 2.3.1 of the validated PD. The PP has provided the information through the following methods:

Writing: a printed version of each document related to the Project, such as the Project design document, monitoring report, validation and verification report and the summary will be available for consultation at the ARC office. Information and news about the Project are disclosed through local public notices /31//32/ and /34/.

Virtual: documents related to the Project are available through virtual means on the VCS and ARC company websites /39/. Also, the circulars of the project is digitally accessible. News and novelties about the Project will be published in the ARC and Dacko newsletter through social media.

Oral: information and news about the Project will also be conveyed orally at Technical Board events through meetings between the community council of agricultural communities and

technicians as well as other opportunities for contact between stakeholders and project proponents /31//32/ and /34/.

This was validated during the site visit and documents proof submitted by the PP. Validation team finds that the measures provided by PP are adequate to provide the information to the stakeholders and ensure their full participation in the project development and implementation process.

3.2.20 Community Costs, Risks and Benefits (G3.2)

Community costs, risks and benefits are described in section 2.3.4 of the validated PD /10/. This information was passed more communities in the stakeholder meetings carried out by the PP in August 2016 and June 2017. These discussions were also part of the PRA conducted with the stakeholders and ability of the community to understand the information was very clear which was assessed during the site visit. The minutes of meetings, PRA reports /25/ and some in person discussions with the local stakeholders were assessed and analysed to validate the information.

Validation team finds that the measures provided by PP are adequate to provide the information about community costs, risks and benefits to the stakeholders and ensure their full participation in the project development and implementation process.

3.2.21 Information to Stakeholders on Validation and Verification Process (G3.3)

The step was explained in section 2.3.5 of the validated PD /10/. As stated before in the report, the stakeholders were informed about the third part validation and verification process in the August 2016 consultation and the PRAs conducted /25/ in the project area. During the meetings and consultation, power point presentation was used, and when performed in areas where there was no electricity, billboards with the same information were used /31//32/ and /34/. In this way, ensured that all participants will always receive the same information about the project cycle.

Validation team finds that the measures provided by PP are adequate to provide the information to Stakeholders on Validation and Verification Process.

3.2.22 Site Visit Information and Opportunities to Communicate with Auditor (G3.3)

The step was explained in section 2.3.6 of the validated PD /10/. The PP has maintained constant and direct communication with the TAF (Land Owner) in order to give the guidelines and clarity aspects related to the project cycle, including validation, registration and project monitoring. The Forest Operations Manager has collected and compiled all the inputs and comments of the workers and the same was discussed with them during the site visit of the DOE.

During the site visit, all the interviewees give positive reply to all the issues and they are satisfied with the project implementation and interventions. They also confirmed that the project process was explained to them during the consultations and meetings and most of them have participated in the stakeholder meeting which was held before the project start. Thus it is verified that stakeholders participated in project development and implementation process.

3.2.23 Stakeholder Consultations (G3.4)

This is explained in section 2.3.7 of the validated PD /10/. The PP carried out the consultations with the stakeholders in 2016 and 2017. The minutes of meetings, attendance sheets and photographs /31//32/ and /34/ of the consultations with the comments from stakeholders were provided to the DOE. The comments raised during the consultations were addressed by the PP. Also, all the reports of PRA's conducted so far were assessed. All the stakeholders interviewed during the site visit gave positive response about the project. While checking all the reports, minutes of meetings, questionnaire responses during site visit, it is confirmed that all the stakeholders agreed to the implementation of the project.

CL 03 was raised and resolved successfully. Refer Appendix 2 for the same. Documents referred CL 02 was raised and successfully closed. Refer Appendix 2 for the same. Referred documents /10//31//32//34/ and /52/.

3.2.24 Stakeholder Consultation Channels (G3.5)

This has been described in section 2.3.9 of the PD /10/. The PP has conducted a number of stakeholder engagement and consultation meetings with identified project communities and other stakeholders from the nearby villages and settlements. The project staffs have conducted PRA's focus group discussions (FGDs), interviews with men and women living in nearby settlements and villages as part of the consultative process. Also, the documentation and information regarding the project were made available on the project website, printed version of each document related to the Project, such as the Project design document, monitoring report, validation and verification report and the summary were available for consultation at the ARC office and information and news about the Project was also be conveyed orally at Technical Board events through meetings between the community council of agricultural communities and technicians as well as other opportunities for contact between stakeholders and project proponents to the community through routine villager assembly and posted on local bulletin boards in both project listing and validation process,

This was validated from the PRAs /25/, socioeconomic survey report /36/ and meetings reports /31//32/ and /34/ and other details submitted by the PP to the VVB. Hence, as per the VVB these steps deemed as the most direct approach for the consultation and sharing information with the local stakeholders and land owners.

3.2.25 Stakeholder Participation in Decision-Making and Implementation (G3.6)

This is discussed in section 2.3.10 of the validated PD /10/. The PP PPs have gone to considerable lengths to consult with local stakeholders and engage them in the project during the project development and implementation process. The PP has conducted free, prior and informed consent (FPIC) /36/ as well as PRAs /25/ which insure full and effective participation of the stakeholders in decision making and implementation of the project since beginning. The stakeholder's inputs were seriously considered and has influenced the overall project development and implementation. This was validated by the FPIC meeting and PRAs reports.

The VVB consider these steps appropriate to ensure stakeholder participation in decision-making and implementation. .

3.2.26 Anti-Discrimination Assurance (G3.7)

The step has been described in section 2.3.11 of the validated PD /10/. The company has policies to prevent discrimination and outline a course of action, should it occur, the Human Resource (HR) policy provides a clear statement on discrimination relating to gender, religion or sexual discrimination. The stakeholder involvement was inclusive without any discrimination of gender, cultural identity and religion. The HR Policy of the PP company /43/ has been reviewed and assessed by the VVB and guarantee that no type of discrimination is tolerated at any point of the project development. .

3.2.27 Feedback and Grievance Redress Procedure (G3.8)

The step has been discussed in section 2.3.12 of the validated PD /10/. The PP Company Grievance Policy /44/ has outlined clear grievance redress mechanism. The policy has been assessed by the VVB and found to be appropriate in addressing any grievance in the future of the project. As of now no grievance was reported till date for the project. .

3.2.28 Worker Training (G3.9)

The step has been discussed in section 2.3.14 of the validated PD /10/. PP has extensive experience in conservation and community development projects. The list of trainings provided to the stakeholders has been documented by the PP and same has been provided to the VVB for validation.

Via checking the training records /45/, VVB finds the trainings to be apt and good efforts are made for skill development of the employee/workers/. .

3.2.29 Community Employment Opportunities (G3.10)

This has been described in section 2.3.15 of the validated PD /10/. The Recruitment Policy /46/ and company Code of Conduct /47/ were validated by the VVB. From the supporting documents submitted by the PP, it has been concluded that the project provides equal employment to people from communities.

3.2.30 Relevant Laws and Regulations Related to Worker's Rights (G3.11)

The details are provided in section 2.3.16 of the validated PD /10/ and it states that the project meets all the applicable laws and regulations related to worker's rights. To confirm the same, employment contract /48/ and company polices were validated /46//43//44/ and /47/. Hence, it has been concluded that the project is implemented and adhere to the respective laws and regulations of the project area.

3.2.31 Occupational Safety Assessment (G3.12)

This has been explained in section 2.3.17 of the validated PD /10/. The VVB checked that the PP has a safety inspection procedure /49/ in place.

3.2.32 Project Governance Structures (G4.1)

This has been explained in section 2.4.1 of the validated PD /10/. The same has been checked and validated during the site visit. In the opinion of VVB, the project governance structure is robust to ensure successful implementation and sustainability of the project.

CAR 10 resolved successfully. Refer Appendix 2 for the same. Documents referred /10/ and /15/.

3.2.33 Required Technical Skills (G4.2)

This has been explained in section 2.4.2 of the validated PD /10/. The same has been checked and validated during the site visit. In the opinion of VVB, the PP and its team has robust technical skills to ensure successful implementation and sustainability of the project.

3.2.34 Management Team Experience (G4.2)

This has been explained in section 2.4.3 of the validated PD /10/. The same has been checked and validated during the site visit. In the opinion of VVB, the PP and its team has robust management team experience to ensure successful implementation and sustainability of the project.

3.2.35 Project Management Partnerships/Team Development (G4.2)

This is defined in section 2.4.4 of the validated PD. ARC designed, developed and implemented the project in collaboration with TFA /15/. No other organizations needed to support the project through partnerships, management team have the sufficient experiences to implement the project and already filled any gaps.

3.2.36 Financial Health of Implementing Organization(s) (G4.3)

The VVB has checked and assessed the financial audits /50/ of the company since the project has started and confirms financial health of the PP. Additionally, the ARC's combined forestry project development experience have contributed to a detailed financial model for the development and management of the Project. Predicted credit sales and an accurate estimated annual budget demonstrate sufficient cash flow from predicted contracted sales to sustain the project through the end of the crediting period. ARC team developed the project through a US based investors in partnership with other organisations within the State of Para in Brazil. Documents supporting these investments can be produced to the project auditor for inspection. ARC has equity investors and a concise business plan and financial modal that are available on request. The project partners are all well-funded, sufficiently capitalized organizations, and include a major companies support like Dacko Nursery and TFA with impressive histories of financial sustainability. The same has been explained in Section 2.4.5 of the PD /10/. Hence, it is concluded by the VVB that the PP financial strategies are sound enough to develop and sustain the project

3.2.37 Avoidance of Corruption and Other Unethical Behavior (G4.3)

This is explained in section 2.4.5 of the validated PD /10/. The VVB has checked and assessed the company policies /43/ and /47/ and audit reports /50/ and found that that its resources are

allocated responsibly and free of corruption. Additionally, the project comply with all law and regulation of the host country including anti-corruption law.

Hence, it is concluded that the project is not involved or allows any form of corruption.

3.2.38 Commercially Sensitive Information (*Rules* 3.5.13 – 3.5.14)

Not applicable.

3.2.39 Statutory and Customary Property Rights (G5.1)

This is explained in Section 2.5.1 of the validated PD /10/. The project area does not belong to any indigenous communities or the government. The project land owner is TFA. The conservation agreements signed freely between ARC group and the owners are the result of the socialization workshops and the commitment of both parties. The project does not lead to any involuntary relocation. The VVB has checked and assessed the land use agreement and onsite observations and interview with local stakeholders residing in the project areas. The project proponents have proven ownership to the land on which the project is designed and implemented /15/.

3.2.40 Recognition of Property Rights (G5.1)

This is explained in section 2.5.2 of the validated PD /10/. The VVB has checked and assessed land and partnership records /15/ and /51/. It is concluded that all property rights and recognized, respected and supported. All properties involved in the project either have property titles or equivalent documents to certify and assure rights over the land. Within the project area, there are no communities of Brazil or indigenous heritage with collective property titles.

3.2.41 Free, Prior and Informed Consent (G5.2)

This step is explained in section 2.5.3 of the validated PD /10/. The project proposes to conduct a process of FPIC to continue the informative process initiated with the PRA in order to promote a reasonable understanding about the project and their activities, an equitable participation in decision-making processes and the involvement of the population in the implementation of the proposed project. Consultations ensure to engage with both men and women, and more marginal stakeholder groups in culturally appropriate ways to ensure that the project can hear a wide range of perspectives. The project will not encroach uninvited on private property, community property, or government property. , The Project has not developed any activity on private property, belonging to indigenous and traditional communities or to the government. In relation to social activities and monitoring of biodiversity, it is guaranteed that no activity will be carried out without the free, prior and informed consent of the parties involved. No activity related to the Project has resulted in the involuntary removal or relocation of the Property Rights Owners of their lands or territories, nor has been forced to relocate activities important to their culture or livelihoods. The FPIC consultation minutes of meetings, attendance sheet & photographs, land records, partnership agreement /10//15//31//32//41//42//45/ and /51/.and onsite interaction with the local residents has been checked and assessed by the VVB. Hence, with the evidences it is concluded that the project is respecting the property rights of the communities.

3.2.42 Property Rights Protection (G5.3)

This is explained in section 2.5.4 of the validated PD /10/. As discussed above the project activities do not lead to involuntary removal or relocation of property rights holders from their lands or territories, and do not force rights holders to relocate activities important to their culture or livelihood. To ensure this The FPIC consultation minutes of meetings, attendance sheet & photographs, /31//41/ and /42/ land records, partnership agreement and onsite interaction with the local residents has been checked and assessed by the VVB.

3.2.43 Illegal Activity Identification (G5.4)

Illegal deforestation especially due to timber harvesting is one of the major issue in the project area. This is one of the main activity to identify, prevent and avoid illegal activities which was taking place in the project area. The project has trained local villagers to work as a monitoring staff inside the project area. Stakeholders in neighbouring villages will be encouraged to report encroachers and illegal loggers trying to get into nearby forests. The step has been explained in Section 2.5.5 of the PD /10/. During the site visit interview with the project management team and local residents it has been assessed that the project management team has a robust strategies to identify such illegal activities and stop such actions on immediate effect. Hence, it is concluded that the project's climate, community and biodiversity impacts will not be affected by any illegal activities.

3.2.44 Ongoing Disputes (G5.5)

The project has no ongoing disputes.

3.2.45 National and Local Laws (G5.6)

The project activities are in compliance with all the laws and regulations listed in section 2.5.7 of the validated PD /10/. The laws and regulations are confirmed through checking the public websites which has been compared with the actual situation of the project by on-site observation /38/.

3.2.46 Approvals (G5.7)

This is explained in section 2.5.8 of the validated PD /10/. The Project is developed on privately owned land and complies with all the required laws and regulations regarding forest enhancement in private lands. Given the fact that the Project will not undertake extractive activities but will enhance and preserve 100% of its Project Area, permits are not required from municipal, state or federal authorities.

Land ownerships /15/ and /51/ and applicable laws were assessed /38/. The VVB concluded that no approval from any government authority is required for project development and implementation.

CAR 11 was raised and resolved successfully. Refer Appendix 2 for the same. Documents referred /10//15//21//22//23//38/ and /51/.

3.2.47 Project Ownership (G5.8)

This is explained in section 2.5.9 of the validated PD /10/. The ownership of the lands of the project area is supported by legal documentation. The PP have the right to develop and

implement the project in the allocated project area which is confirmed by the agreement of partnership between ARC and TFA /15/.

3.2.48 Management of Double Counting Risk (G5.9)

This is explained in section 2.5.10 of the validated PD /10/. The project has not nor does it intend to create non-VCS/CCB GHG emissions reductions or any another form of environmental credits. Declaration letter /52/ for the same has been submitted by the PP to the VVB.

CL 02 was raised and successfully closed. Refer Appendix 2 for the same. Referred documents /10/ and /52/

3.2.49 Emissions Trading Programs and Other Binding Limits

The PP declared in the section 2.5.11 PD /10/ that it does not apply.

3.2.50 Other Forms of Environmental Credit

The ARC A/R Project is not intended to generate any other form of environmental credits related to the reductions and removals of GHG emissions claimed under the VCS (Verified Carbon Standard) program. The same is mentioned in section 2.5.12 of the validated PD /10/.

3.2.51 Participation under Other GHG Programs

The ARC A/R Project did not receive or sought to be registered in any other GHG program, in addition to submitting the Project to validation and verification in the VCS and CCBS. The same is mentioned in section 2.5.13 of the validated PD /10/.

3.2.52 Projects Rejected by Other GHG Programs

The ARC A/R Project has not undergone validation/verification of any other GHG program and is therefore not rejected by any other GHG program. The same is mentioned in section 2.5.14 of the validated PD /10/.

3.2.53 Double Counting (G5.9)

To date, the State of Pará, Brazil does not have a defined State REDD+ Strategy or any Forum for Climate Change registry, that would be the main organization to lead discussions on the subject, is currently inactive. In addition, the State Government does not provide formal procedures for registering or recognizing private voluntary projects under any jurisdiction project. Also, the project does not intent to get the project registered any other carbon market registry. Hence, it is concluded that there will be no issues of double counting of carbon credits generated from the project.

CL 02 was raised and successfully closed. Refer Appendix 2 for the same. Referred documents /10/ and /52/

3.3 Climate

3.3.1 Title and Reference

The project has applied CDM Methodology AR-ACM0003. Afforestation and reforestation of lands except wetlands. Version 2.0 /4/.

Tools applied:

- "Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities"; Version 1.

- "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; Version 4.2.

- "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities"; Version 3.1.

- "Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities"; Version 1.1.0.

- "Estimation of non-CO2 greenhouse gas (GHG) emissions resulting from burning of biomass attributable to an A/R CDM project activity"; Version 4.0

CAR 12 and CAR 24 was raised and resolved successfully. Refer Appendix 2 for the same. Documents referred /10//4//5//37//63/ and /64/.

3.3.2 Applicability

Table 8: Applicability conditions of the methodology VM0015

Condition	Applicability	VVB Assessment
Methodology applicability		
a. The land subject to the project activity is not categorized as 'wetland'	Fragile lands such as forests, lagoons, flood plains, wetlands and water bodies were excluded from project boundary given the analysis of land eligibility that was carried.	The project area does not fall into wetland category. This was confirmed during the site visits and satellite images provided /14//53/ by the PP.
b. Soil disturbance attributable to the project activity does not cover more than 10% of area in each of the following types of land, when the land is included within the project boundary: □ Land containing organic soils; □ Land which, in the	(a) The soil within the Project boundaries is not an organic soil as proved by the soil analysis done by Rodrigues et al. (2013) and the presence of sand reaches nearly 90%, so it is considered a sandy with clay soil. (b) The land within the Project boundaries was a degraded grasslands, without receiving inputs such as listed in	With the available references and discussions & investigation during site visits following was confirmed: • Soil disturbance attributable to the Project activity does not cover more than

baseline, is subject to land-use and management practices and receive inputs listed in "appendices 1 and 2 of the AR-ACM003 methodology."	appendices 1 and 2 to the methodology AR-ACM0003. Such grasslands under tropical conditions have less carbon compared to plantations and forest cover. Therefore, it is expected for soil organic carbon to increase more in the presence of the Project activity relative to the previous land use. In addition during the soil preparation phase at the beginning of the Pre-Project phase, no extensive surface treatments have been carried out with the exception of the closure of the deep erosions, of the digging pits for the plantlets and the ploughed perimeter band to reduce the risk of fire. Soil disturbance attributable to the Project activity does not cover more than 10%. The absence of extended soil processing in unsaturated sandy soils has reduced the losses of organic matter originally present as well as maintaining a natural mulching capable of preserving the soil moisture and favouring the development of natural microbial fauna.	10%. • Soils in the proposed project are mineral soils and do not contain organic soils • Soil organic carbon will increase due to the project activities • No extensive surface treatments have been carried out for the plantation activities • The project lands are degraded barren lands covered without any input, thus the lands in the baseline is not subjected to land-use and management practices and receives inputs listed in appendices 1 and 2 to the applied methodology.
Tools applicability		
Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities. (a) This tool is applicable for forestation of the land within the proposed project boundary performed with or without being registered as the A/R CDM project activity shall not lead to violation of any applicable law even if the law is not enforced.	(a) Forestation of the land will not lead to violation of any applicable law. (b) The proposed Project is not a small scale afforestation and reforestation project.	During site visit and review of referenced documents /38/ it was confirmed that the project will not lead to any violation of any applicable law The project is large scale reforestation project and was confirmed during site visit, review of PD /10/ and ER calculation spreadsheet /11/.

(b) This tool is not applicable to small-scale afforestation and reforestation project activities.		
Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities. This tool has no internal applicability conditions.	This tool has no internal applicability conditions. Hence, no justification required.	No justification required for applicability of the tools
Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities. This tool has no internal applicability conditions.	This tool has no internal applicability conditions. Hence, no justification required.	No justification required for applicability of the tools
Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities This tool is applicable when the areas of land, the baseline scenario, and the project activity meet the following conditions: (a) The areas of land to which this tool is applied: (i) Do not fall into wetland category; (ii) Do not contain organic soils as defined in Annex A: Glossary of the IPCC GPG LULUCF 2003; (iii) Are not subject to any of the land management practices and application of inputs as listed in the Tables 1 and 2;	(a) The Project areas of land do not fall into wetland category, do not contain organic soils and are not subject to any of the land management practices and application of inputs as listed in the Tables 1 and 2. (b) The litter remain on site and will not be removed in any site. Besides the soil disturbance is done by following appropriate soil conservation practices and it is only for site preparation before planting. (c) The lands belonging to the project activity were degraded lands where slash and burn had been practiced and left abandoned without any activity. This has been evident during the assessment of the eligibility of land. Thus, the project activity does not lead to a shift of pre-project activity out-side the project boundary. Hence this applicability condition has met.	The project area is not a wetland. This was confirmed during the site visits and satellite images provided /14//53/ by the PP. With the available references and discussions & investigation during site visits following was confirmed: • Soil disturbance attributable to the Project activity does not cover more than 10%. • The soil within the Project boundaries is not an organic soil • Soil organic carbon will increase due to the project activities. No extensive surface treatments have been carried out for the plantation activities

(b) The A/R CDM project activity meets the following conditions: (i) Litter remains on site and is not removed in the A/R CDM project activity; (ii) Soil disturbance attributable to the A/R CDM project activity, if any, is: • In accordance with appropriate soil conservation practices, e.g. follows the land contours; Limited to soil disturbance for site preparation before planting and such disturbance is not repeated in less than twenty years.		
Estimation of non-CO2 greenhouse gas (GHG) emissions resulting from burning of biomass attributable to an A/R CDM project activity The tool is applicable to all occurrence of fire within the project boundary. Non-CO2 GHG emissions resulting from any occurrence of fire within the project boundary shall be accounted for each incidence of fire which affects an area greater than the minimum threshold area reported by the host Party for the purpose of defining forest, provided that the accumulated area affected by such fires in a	No burning of biomass is attributable to the Project activity, thus project emissions are accounted as zero	The tool have no specific applicability conditions. Hence no justification required.

given year is ≥5% of the project area.		

Tool for "Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity" has not been applied since there is no displacement of pre-project agriculture activities.

CAR 13 was raised and resolved successfully. Refer Appendix 2 for the same. Documents referred /10//4//5//37//63/ and /64/.

3.3.3 Project Boundary

The PD defines the project area, which is 39,150 ha of degraded land, inside the rainforest o Amzon. The project is located in the eastern part of the Brazil in the state of Para, which is shared between three municipalities of Paragominas, Ulianopolis and Nova Esperanca do piria.

The area and location has been confirmed via checking the project design and shape files and other images of project boundaries /14//51/ and /53/ submitted by the PP. The boundaries include the administrative boundaries of the county. The following table present the carbon pool considered within the project boundary:

Carbon pools included/excluded (Refer to Table 1 of the applied methodology)

Carbon pools	Selected?	Justification / Explanation
Above-ground	Yes	Major carbon pool subjected to the project activity
Below-ground	Yes	Major carbon pool subjected to the project activity
Dead wood	No	Conservative approach under applicability condition
Litter	No	Conservative approach under applicability condition
SOC	Yes	Calculated approach

Carbon sources included/excluded (Refer to Table 2 of the applied methodology)

Sources	GHGs	Included?	Justification/Explanation
Burning of biomass	CO2	Excluded	CO2 emissions due to burning of biomass are accounted as a change in carbon stock.
	CH4	Included	Burning of woody biomass for the purpose of site preparation, or as part of forest management is not practiced. Hence emissions are zero.
	N2O	Included	Burning of woody biomass for the purpose of site preparation, or as part of forest management is not practiced. Hence emissions are zero.

The project boundary was assessed in the context of physical site inspection, interviews, and on the secondary evidence received on the design of the project /4//10//11/ and /59/. The VVB team concluded that the appropriate carbon pools have been considered and the description in the PD

is accurate and complete, and also the selected carbon pools are justified for the proposed project activity.

CAR 14 was raised and resolved successfully. Refer Appendix 2 for the same. Documents referred /10//4//11/ and /59/.

3.3.4 Baseline Scenario

The PDD identifies the baseline scenario as "Continuation of current barren lands with grazing on some lands". This baseline scenario was deter-mined by using the A/R Methodological tool "Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities" (Version 01) as required by the methodology. Combined Tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities" is applied. Hence, proceed to Section 3.3.5

3.3.5 Additionality

For the assessment and demonstration of additionality and the identification and justification of the baseline scenario are described using the "Combined tool to identify baseline scenario and demonstrate additionality in A/R CDM project activities (Version 01)", issued by the CDM executive board at the United Nations, which shall be hereinafter referred to as "additionality tool"., is used.

Following steps were taken to conclude the baseline scenario and project additionality:

STEP 0. Preliminary screening based on the starting date of the A/R project activity

The starting date of the project activity is January 1st 2016, which is after December 31, 1999.

Demonstration	Justification	VVB Assessment
Provide evidence that the starting date of the A/R CDM project activity was after 31 December 1999.	As per the land records, it is clear that TFA did not even own the land until 2014, so the project could not have occurred prior to this date.	Land records /51/ and agreement between the PP and land owner checked /15/. Hence the evidences provided are sufficient to prove that the starting date of the A/R CDM project activity was after 31 December 1999.
Provide evidence that the incentive from the planned sale of VCUs was seriously considered in the decision to proceed with the project activity. This evidence shall be based on (preferably official, legal and/or other corporate) documentation that was available to third parties at, or prior to, the start of	The project is factually uneconomical without loans from the bank or the sale of VCUs, to plant trees on the property. A very large number VCU's has to be sold to subsidize the planting operation. There is no willing person that will provide direct capital investment for a planting	The audited financial sheet was validated and it is evident that the incentive from the planned sale of VCUs was seriously considered in the decision to proceed with the project activity.

the project activity.	operation in the amazon. The only way for this to be economical is via carbon credit sales and bank credit loans. Financial sheets have been submitted to the DOE.	

STEP 1. Identification of alternative land use scenarios to the proposed A/R CDM project activity

This step serves to identify alternative land use scenarios to the proposed project activity that could be the baseline scenario, through the following sub-steps:

Sub-step 1a. Identify credible alternatives land use scenarios to the proposed project activity

In the specific area where the Project will focus, the alternative land uses in absence of the VCS forestry project are cattle ranching and agriculture activities and the forestry activities without the VCS component.

Scenario	Description	VVB Assessment
Scenario 01: continuation of the pre-project land use: cattle ranching.	The Scenario 01 is the continuation of the pre-project land use and corresponds to the degraded pasture lands with extensive cattle ranching. Land-use scenarios for this Project have been identified using primary and secondary sources of information. Primary sources include social assessment activities undertaken on the Project Boundaries through the months of December 2016 and June 2017. Several local interviews, field surveys and land use records were checked for the land history in and around the project area. Before 1989, the project area was a forest area. Cattle ranching is the main deforestation activity in the project area. Cattle ranchers can expand their activities by their own means (in the case of well-capitalized agents) or as part of a process that includes pioneer agents such as selective loggers and squatters (in the case of small and medium size ranchers). Interactions among these agents are the result of common drivers and underlying forces of deforestation that are based mostly on securing land ownership and also in economic profits. Extensive cattle ranching is the number one culprit of deforestation in virtually every Amazon country, and it accounts for 80% of current deforestation (Nepstad et al. 2008). Alone, the deforestation caused by cattle ranching is responsible for the release of 340 million tons of carbon to the atmosphere every year, equivalent to 3.4% of current	After validation of all the supporting documents and land records /17//25//36//51/ and /53/ and site visits investigation it was confirmed continuity of Scenario 1 in the absence of the proposed project activity.

	global emissions. Beyond forest conversion, cattle pastures increase the risk of fire and are a significant degrader of riparian and aquatic ecosystems, causing soil erosion, river siltation and contamination with organic matter. Trends indicate that livestock production is expanding in the Amazon. According to IBGE (2018), the state of Para has a total of 19,123,411 million bovines and represents 7.62% of the total bovine herd of Brazil (255.9 million of cattle in 2018). For cattle breeding is used natural grasslands and lands, originally occupied by the Cerrado that had suffered a process of deforestation and were transformed into pasturelands. This deforestation process is still existing throughout Brazil.	
	According to Kirby (2005) the annual rate of deforestation in the Brazil has continued to increase from 1990 to recent years because of several factors, both local and international. The removal of *rainforest*, to make way for cattle ranching, was the leading cause of deforestation and land degradation in the Para State. Cattle ranching in Para State has resulted in massive deforestation and it is regarded as one of the main causes of fragmentation and land degradation, affecting the ecosystem, biodiversity and conservation. In addition, there are significant evidences of erosions and structural degradation. Under the Deforestation Monitoring Program of the Brazilian Biomes of the Ministry of Environment, the current situation of deforestation in the *rainforest* has been mapped (2012), based on the comparison of satellite images. According to this mapping, between 2002 and 2010, the Cerrado or Savannah had its cover removed by 92,710 km², which is approximately 11,588 km² deforested annually during this period. The percentage of deforested areas in 2002 was 55.7% and in 2010, rose to 60.2%. Land-use scenarios for this Project have been identified using primary and secondary sources of information. Primary sources include social assessment activities undertaken on the Project Boundaries through the months of December 2016 and June 2017. Several local interviews, field surveys and land use records were checked for the land history in and around the project area. Currently, in	

	some regions of Brazil, deforestation and a form of irrational extensive cattle ranching are causing serious desertification phenomena. The recent research work "*Desertificacao, degradacao da terra e secas no Brazil*", conducted by CGEE (2016) states that "the climate is not responsible for the extreme soil impoverishment", which already characterizes many regions of Brazil. It also points out that "while drought is a climatic phenomenon, desertification is a human phenomenon". The same document has also highlighted that "the deforestation of primary forests for the use of timber and the subsequent allocation of pastures for livestock rearing, associated with the lack of measures to curb soil erosion, inexorably lead to the soil impoverishment down to its ultimate "collapse". In conclusion cattle ranching is very prominent in the state of Para (and in Brazil overall) it is clearly established in the local economic culture but if managed in an irrational manner may cause serious repercussions on environment, land and climate.	
Scenario 02: forestation of the land within the Project boundary performed without being registered as the A/R CDM project activity.	The Scenario 02 is represented by forestation of the land within the Project boundary performed without being registered as the A/R CDM project activity. Based on the primary and secondary sources which include social assessment activities undertaken on the Project Boundaries through the months of December 2016 and June 2017 and local interviews: The Brazilian Amazon is the world's largest rainforest, with unequalled biodiversity and surface freshwater. The Brazilian Amazon (Amazônia Legal Brasileira), hereafter referred to as simply the Amazon, denotes an even larger area including both forests and savanna. It occupies 5 million km2 , of which 74% are forests, 13% are savannas and grasslands and 13% have been deforested (INPE 1998). Brazil is the largest producer of tropical timber in the world, with over 90% of its output coming from the Amazon. Logging activities in the Amazon have grown significantly in the last two decades. Roundwood production rose from 4.5 million m3 in 1976, to 28 million m3 in 1997, originating mainly from the States of Pará, Mato Grosso and Rondônia. Most (80%) of the timber extraction and processing occurs in an arc in the southern portion of the Amazon that goes from Rondonia throughout northern Mato Grosso to the	After validation of all the supporting documents and land records /17//25//36//51/ and /53/ and site visits investigation it was confirmed continuity of Scenario 1 in the absence of the proposed project activity.

	south and east of Pará. Brazil is also the world's largest consumer of tropical timber. Thus the majority of timber produced in the Amazon (86%) goes to the domestic market, and especially to Southeastern Brazil, with estimated total revenues of about US$ 2.2 billion/year (Smeraldi and Verissimo 1999, Lele et al 2000). Brazil has millions of hectares of planted with reforestation species as Southern Blue Gum (*Eucalyptus globulus)*, Chir Pine (*Pinus roxburghii)* and other species like Acacia (*Acacia mearnsii*), Seringueira (*Hevea spp*.), Teca (*Tectona grandis*), Parica (*Schizolobium parahyba*), Araucaria (*Araucaria angustifolia*) and Alamo (*Populus spp*.), used in the production of pulp, paper, architecture, furniture, energy and biomass. In addition, planted trees play an important role preventing deforestation of native forests, protecting biodiversity and preserving the soil and springs. They recover degraded areas and they contribute to reducing GHG, as they are natural carbon inventories. Today these planted forests occur mostly in monoculture systems and rarely associated in two or more species. In recent years, major progress has been made by research on these agroforestry systems and it has shown many favorable results in all respects, from an economic, environmental and social point of view. Some important functions of planted forests are: ▪ Decreased pressure on native forests; ▪ Restoration of degraded lands due to agriculture and livestock breeding; ▪ Carbon sequestration; ▪ Soil and water protection; ▪ Shorter production cycles than in temperate climate countries (because of the rapid growth of the plants due to the longer photoperiod and to the abundance of the rain water typical of the humid tropical zones); ▪ Improved product consistency, facilitating all mining and industrial processes. Planting activity is managed in accordance with sustainable forestry management principles, aiming to reduce environmental impacts and pursuing the goal to promote economic and social development of the communities surrounding the plantations. In general, these lands are initially degraded, but they suit the needs of the plantations. The plantations also allow preserving extensive areas of	

	natural resources in places named in Brasil as Permanent Preservation Areas (PPA) and Legal Reserves (LR). In the state of Para are present reforestation areas with commercial species and according to the IBGE (*Instituto Brasileiro de Geografia e Estatistica*) in the state of Para the total area occupied by forest plantations is less than 100,000 hectares, making it the 2nd largest state in Brazil, a state in the Brazilian Amazon, but also a state with insignificant reforestation activities compared to nearly 5 million hectares or Afforestation and Reforestation in the other regions of Brazil. Cattle ranching is the largest driver of deforestation in every Amazon boundary, accounting for 80% of current deforestation rates. Amazon Brazil is home to approximately 200 million head of cattle, and is the largest exporter in the world, supplying about one quarter of the global market. Low input cost and easy transportation in rural areas make ranching an attractive economic activity in the forest frontier; low yields and cheap land encourage expansion and deforestation. Approximately 450,000 square kilometers of deforested Amazon in Brazil are now in cattle pasture. Cattle ranching and soy cultivation are often linked as soy replaces cattle pasture, pushing farmers farther into the Amazon. LANDSAT data interpreted at Brazil's National Institute for Space Research (INPE) indicate that, by 2003, forest cleared in Brazilian Amazonia had reached 648.5 × 10^3 km² (16.2% of the 4 × 106 km² originally forested portion of Brazil's 5 × 106 km² Legal Amazon Region), including approximately 100 × 10^3 km² of "old" (pre-1970) deforestation in Pará and Maranhão (Brazil, INPE 2004).	

Outcome of Sub-step 1a:

- Cattle ranching.
- Forest plantations (without being registered as a carbon project).

Sub-step 1b. Consistency of credible alternative land use scenarios with enforced mandatory applicable laws and regulations.

According to the information in sub-step 1a all of these alternative land use scenarios are legal and enforced by mandatory applicable laws and regulations taking into account the enforcement in Brazil and the state of Para.

In summary the alternative land uses scenarios in the Project Area that are in compliance with all mandatory applicable legal and regulatory requirements are:

▪ Cattle farming: this activity is regulated by the following main laws: Law n° 11,443 - January 5, 200758, Law n° 12,727 - October 17, 201259, Law n° 12,805, April 29, 201360.

The following table presents the plausible alternatives that are in compliance with mandatory legislations of Brazil.

Table 12: Plausible alternatives that are in compliance with mandatory legislations of Brazil

Sl. No	Alternative	In compliance with national laws and regulations (Yes/No)
1	Implementing the proposed project activity without registering as a AR-CDM project	Yes
2	Continuation of the abandoned and degraded land use situation with no project activity.	Yes

Sub-step 2a. Identification of barriers that would prevent the implementation of at least one alternative land use scenarios.

a) Investment barrier

The commercial forestry sector is not particularly attractive for professional investors because it has a business-model characterized by unfavorable elements:

▪ High concentration of costs in the first years of production;
▪ Long production cycle;
▪ Long wait for economic returns.
▪ Infrastructure barriers

Because of this reason who decides to invest in this specific sector are the big enterprises that belong to the wood supplying chain and that have significant financial availability.

Other constraints listed are:

- **Technological barriers:** The quality of seedlings is one of the most important factors for the success of forestry plantation, it is quite difficult to get in touch with the quality seedlings vendor in Brazil. There is no Eucalyptus Research Institute where people can get information in Brazil. Even though the project developer is supposed to provide the technological know-how under the 2+3 scheme, without a relevant institute in the country, planting eucalyptus in this remote area face barriers and incurs extraordinary costs on the part of the investor.
- **Social barriers:**
  - **Lack of skilled and/or properly trained labor force:** The labor force that inhabit the countryside that surround the Project Area do not have experience in reforestation. Reforestation activities are not part of the traditional economic culture in the state of Para, and institutional and technological support are lacking.
  - **Barriers related to local tradition:** Discussions with the local communities have proven they have scant knowledge in technical know-how, laws and regulations, present market conditions and practices relating to eucalyptus planting and management. They also lack knowledge on environmentally friendly agricultural activities although agriculture is their

main source of income. Slash and burn practice is common among them. Eucalyptus planting has not been a traditional activity among them.

Detailed justification and analysis is provided in Section 3.1.5 of the PD /10/.

Outcome of Step 2a:

List of barriers that may prevent one or more land use scenarios identified in the Step 1b:

- Investment barrier
- Social barrier
- Technological barrier

Sub-step 2b. Elimination of land use scenarios that are prevented by the identified barriers
Reforestation without carbon revenues faces at least one of the identified barriers. Extensive cattle farming is the only land use alternative that does not face any of the identified barriers.

Project Alternative	Barrier Faced
Cattle Farming	No Barriers faced
Forest Plantations (without being registered as a carbon project).	• Investment barrier • Social Barrier • Technological barrier

Forest plantations without carbon revenues face the identified barriers. Degraded pasture by extensive livestock is the land use alternative does not face any of the identified barriers. Forest plantation with carbon revenues will alleviate the identified barriers.

Outcome of Sub-step 2b:

List of land use scenarios that are not prevented by any barrier:
▪ Cattle farming

To prove the above scenarios and berries, PP has provided the following:

- Relevant legislation, regulatory information or environmental/natural resource management norms, acts or rules /38/
- Relevant (sectoral) studies or surveys (e.g. market surveys, technology studies, etc) undertaken by universities, research institutions, associations, companies, bilateral/multilateral institutions, etc /17/
- Relevant statistical data from national or international statistics /17/
- Documentation of relevant market data (e.g. market prices, tariffs, rules) /17/
- Documents prepared by the project developer, contractors or project partners in the context of the proposed project activity or similar previous project implementations /61/
- Written documentation from the A/R CDM project developer, financial or budgetary information /60/

Sub-step 2c. Determination of baseline scenario
Applying the decision tree presented in point 18 of the "*Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project* (Version 01)" is concluded that:

- ***Reforestation without being registered as an A/R VCS Project activity is included in the list of land use scenarios that are prevented by the barriers listed.***
- ***Cattle farming is the baseline scenario.***

Step 3 – Investment Analysis – Not applicable since only one scenario identified in sub-step 2b

Step 4. Common practice analysis
In the state of Para there are reforestation projects but there aren't projects registered as A / R VCS Projects as evidenced by the VCS database http://www.vcsprojectdatabase.org/#/projects and the UNFCC | CDM http://cdm.unfccc.int/Registry/index.html.

Planted Forests today represent very small area of the total area of the municipalities. The main use for the wood is directed toward Suzano Cellulose (A paper mill).

As shown in the *"Plano Estadual de Desenvolvimento Sustentavel de Florestas Plantadas - PEF/MS, 2008"*, 54% of planted areas belong to a single company, the VCP - Vontorantim Celulose e Papel group, 20% of planted areas belongs to 9 other big companies and finally just 26% belongs to a large number of small and medium-sized producers.

Hence, as evident with the references, 90% of the State of Para commercial timber production is from native forest extraction both legal and illegal. These large forestry companies have close links with the timber processing industries and together they affect almost the entire market. Compared to medium and small timber producers these companies have great advantages, including lower costs due to economies of scale, greater contractual power and easy access to credit.

Small and medium timber producers (barely 26% according to *"Plano Estadual de Desenvolvimento Sustentavel de Florestas Plantadas - PEF/MS, 2008")* are facing the investment and social barriers already widely described in the Sub-step 2a. The Project Owner is one of them.

This is the reason why in the Municipality, where the Project is implemented, commercial reforestations are not commonly practiced and additional financial support is required to develop, implement and sustain the project.

From the above analysis it is concluded that the project is not viable in BAU scenario, and additional financial support is required to develop, implement and sustain the project.

In regard to the baseline scenario and additionality the VVB confirms the following statements:

- All the assumptions and data including references and sources used by the project participants are listed in the PD. Assumptions and data used in the identification of the baseline scenario are justified appropriately, supported by evidence, and can be deemed reasonable

- All documentation used is relevant for establishing the baseline scenario and correctly quoted and interpreted in the PD;

- Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD;

- The approved baseline methodology and referred tool was correctly applied to identify the most reasonable baseline scenario, and the identified baseline scenario reasonably represents what would occur in the absence of the proposed VCS project activity.

CAR 15 was raised and resolved successfully. Refer Appendix 2 for the same. /5//10//15//21//22//23/27//28//38//39//40//50//51//60/ and /61/.

3.3.6 Methodology Deviations

Not applicable

3.3.7 Quantification of GHG Emission Reductions and Removals

Quantification of GHG emission reduction and removals is calculated as per the steps and equations mentioned in the CDM AR-ACM0003, A/R Large-scale Consolidated Methodology, Afforestation and Reforestation of lands except wetlands v2.0

3.3.7.1 Baseline Emissions

Equation 1 of the methodology is used to calculate the baseline emissions of the project.

$$\Delta C_{BSL,t} = \Delta C_{TREE\_BSL,t} + \Delta C_{SHRUB\_BSL,t} + \Delta C_{DW\_BSL,t} + \Delta C_{LI\_BSL,t}$$

Where:

$\Delta C_{BSL,t}$	Baseline net GHG removals by sinks in year t; t CO2-e
$\Delta C_{TREE\_BSL,t}$	Change in carbon stock in baseline tree biomass within the project boundary in year t, as estimated in the tool "*Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities*"; t CO2-e
$\Delta C_{SHRUB\_BSL,t}$	Change in carbon stock in baseline shrub biomass within the project boundary, in year t, as estimated in the tool "*Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities*"; t CO2-e. No shrub is expected in the project activity, thus it is not accounted.
$\Delta C_{DW\_BSL,t}$	Change in carbon stock in baseline dead wood biomass within the project boundary, in year t, as estimated in the tool "*Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities*"; t CO2-e.
$\Delta C_{LI\_BSL,t}$	Change in carbon stock in baseline litter biomass within the project boundary, in year t, as estimated in the tool "*Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities*"; t CO2-e

A/R Methodological tool "*Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities*" (Version 04.1) has been considered to calculate the carbon stock in trees and shrubs

$\Delta C_{TREE\_BSL,t}$ is accounted as zero, due to the following given reasons:

- The Baseline trees are neither harvested, nor cleared, nor removed throughout the crediting period of the Project activity;
- The Baseline trees do not suffer mortality because of competition from trees planted in the project, or damage because of implementation of the Project activity, at any time during the crediting period of the project activity;
- The Baseline trees are not inventoried along with the project trees in monitoring of carbon stocks but their continued existence, consistent with the baseline scenario, is monitored throughout the crediting period of the Project activity.

$\Delta C_{SHRUB\_BSL,t}$ Assumed to be zero in the baseline scenario, due to the fact that changes in carbon stock of above and below ground biomass of non-tree vegetation of the degraded land in baseline scenario is not possible. Not calculated.

$\Delta C_{DW\_BSL,t}$ and $\Delta C_{LI\_BSL,t}$ are assumed to be zero due to the fact that the baseline scenario was degraded pasture, where fire was often used to clear the land, which did not allow accumulation of dead wood and litter.

Hence,

$$\boldsymbol{\Delta BSL, t = 0}$$

3.3.7.2 Project Emissions

The applied methodology considers non-CO2 emissions as a result of the implementation of the proposed project activity within the project boundary due to burning of biomass of ex-isting vegetation. The methodology refer tool for "*Estimation of non-CO_2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity" v*4.0".
However, no burning of biomass for site preparation and forest management is foreseen in the project activity (IRL 2). Hence, no emissions are expected

Hence,

$$\boldsymbol{GHG_{E,t} = 0}$$

This was confirmed during the site visit investigation and the supporting documents provided /

3.3.7.3 Leakage

The Project activity does not expect any displacement of agricultural activities present in the Project Zone before the beginning of the Project, thus leakage emissions are considered insignificant and hence accounted as zero.

In addition to this the area around the project area has been absolutely devastated during past periods of deforestation. The project area is an island surrounded by devastated area.

Starting from 2012 the cattle were gradually sold as they reached maturity for the marketing of the meat. Since January 2013, month of the beginning of the Project until today there are no cattle in the farm, except several milk cows owned by the farm keeper for his self-consumption. Because of that, no leakage management zone was identified.

Also market leakage and activity-shifting leakage is negligible (in the farm were bred 600-800 bovines, that represent the 0,0004% of the Brazilian herd, composed by more than 200 million cows).

Hence,

$$\boldsymbol{Lk_{,t} = 0}$$

3.3.7.4 Net GHG Emission Reductions and Removals

According to the chosen methodology AR-ACM0003 the calculation of GHG removals by sinks is based on baseline net GHG removals by sinks, actual net GHG removals by sinks and the net anthropogenic GHG removals by sinks which conclude in the ex-ante estimations of VCUs.

The ex-ante estimation of biomass is based on literature values (e.g. wood densities or biomass expansion factors) and volume functions.

The ex-post measurements and calculation of biomass and carbon stocks is based on allometric or volume equations using monitored input data like diameter at breast height and height of trees. During monitoring it will be decided whether, instead of standard values, project-specific parameter, e.g. for the biomass expansion factors, will be applied through destructive sampling.

Change in carbon stock in trees between two points

It is estimated by using " Direct estimation of change by re-measurement of sample plots ".

Under this method, the change in carbon stock in trees and the associated uncertainty are estimated as follows:

$$\Delta C_{TREE} = C_{TREE,t_2} - C_{TREE,t_1} \qquad \text{Equation (1)}$$

$$u_{\Delta C} = \frac{\sqrt{\left(u_1 \times C_{TREE,t_1}\right)^2 + \left(u_2 \times C_{TREE,t_2}\right)^2}}{|\Delta C_{TREE}|}$$ Equation (2)

Where:

ΔC_{TREE} = Change in carbon stock in trees during the period between two points of time t_1 and t_2; t CO_{2e}
C_{TREE, t_1} = Carbon stock in trees as estimated at time t_1; t CO_{2e}
C_{TREE, t_2} = Carbon stock in trees as estimated at time t_2; t CO_{2e}
$u_{\Delta C}$= Uncertainty in ΔC_{TREE}
u_1, u_2 = Uncertainties in C_{TREE, t_1} and C_{TREE, t_2} respectively

Stratification

The stratification was defined according to the A/R Large-scale Consolidated Methodology "*Afforestation and reforestation of lands except wetlands*", Version 2.0, Section 5.3.12.b: "*For actual net GHG removals by sinks the stratification for ex ante estimations is based on the project planting/management plan"*

Stratum	Area(Ha)	Starting Crediting Year
Stratum 1	39,150	2016
Total Area	39,150	

Estimating carbon stock in trees at a point of time

To estimate the carbon stock in tree biomass at a point of time, tool for: "*Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities*", v04.2 has been used. According to Section 8.2 of this tool, this method is used for ex-ante estimation (projection) of carbon stock in tree biomass. Under this method existing data are used in combination with tree growth models to predict the growth of trees and the development of the tree stand over time.

Step 1: Tree biomass estimation

The carbon stock in trees within the project boundary at a point in time (C_{TREE}) is estimated by applying the AR-TOOL 14, chapters 8.1.1. As in the tool, the index t is omitted in the following. All parameters refer to the time of measurement.

$$C_{TREE} = \frac{44}{12} \times CF_{TREE} \times B_{TREE}$$ Equation (12)

$$B_{TREE} = A \times b_{TREE}$$ Equation (13)

$$b_{TREE} = \sum_{i=1}^{M} w_i \times b_{TREE,i}$$ Equation (14)

Uncertainty is estimated as follows:

$$u_C = \frac{t_{VAL} \times \sqrt{\sum_{i=1}^{M} w_i^2 \times \frac{s_i^2}{n_i}}}{b_{TREE}}$$ Equation (15)

According to the AR-TOOL 14 Appendix 2, uncertainty discounting has to be applied if u_c is estimated to be bigger than 10%. To avoid this, the number of sample plots may be increased as described in the sampling plan.

Where:

C_{TREE} = Carbon stock in trees in the tree biomass estimation strata; t CO_{2e}
CF_{TREE} = Carbon fraction of tree biomass; t C (t d.m.)-1.
A default value of 0.47 is used unless transparent and verifiable information can be provided to justify a different value.
B_{TREE} = Tree biomass in the tree biomass estimation strata; t d.m.
A = Sum of areas of the tree biomass estimation strata; ha
b_{TREE} = Mean tree biomass per hectare in the tree biomass estimation strata; t d.m. ha-1
w_i = Ratio of the area of stratum i to the sum of areas of tree biomass estimation strata (i.e. $w_i = A_i / A$); dimensionless
$b_{TREE,i}$ = Mean tree biomass per hectare in stratum i; t d.m. ha-1
u_c = Uncertainty in C_{TREE}
t_{VAL} = Two-sided Student's t-value for a confidence level of 90 per cent and degrees of freedom equal to *n – M*, where n is total number of sample plots within the tree biomass estimation strata and *M* is the total number of tree biomass estimation strata
s^2_i = Variance of tree biomass per hectare across all sample plots in stratum i; (t d.m. ha-1)2
n_i = Number of sample plots in stratum i.

Mean change in tree biomass per hectare in a stratum and the associated variance are estimated as follows:

$$\Delta b_{TREE,i} = \frac{\sum_{p=1}^{n_i} \Delta b_{TREE,p,i}}{n_i}$$ Equation (7)

$$s^2_{\Delta,i} = \frac{n_i \times \sum_{p=1}^{n_i} \Delta b^2_{TREE,p,i} - \left(\sum_{p=1}^{n_i} \Delta b_{TREE,p,i}\right)^2}{n_i \times (n_i - 1)}$$

Equation (8)

Where:

$\Delta b_{TREE,I}$ = Mean change in tree biomass per hectare in stratum *i*; t d.m. ha^{-1}

$\Delta b_{TREE,p,I}$ = Change in tree biomass per hectare in plot *p* in stratum *i*; t d.m. ha^{-1}

$S^2_{\Delta,I}$ = Variance of mean change in tree biomass per hectare in stratum *i*; (t d.m. ha^{-1})^2

n_i = Number of sample plots, in stratum *i*, in which tree biomass was re-measured

An equation for *Eucalyptus* urophylla (species used for the project) derived from age has not been found. The equations available for this species depend on allometric parameters and there is not an available database with allometric parameters that allow us to adjust a time equation to estimate the ex-ante carbon stocks.

Considering this, the annual increment in volume of wood suitable for industrial processing value (I) of 40 m^3ha-1year-1 (trunk biomass volume) was used in combination with other parameters derived from Annex 3A.1 "Biomass Default Tables for Section 3.2 Forest Land" of IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry (IPCC GPG LULUCG), to find the total biomass per ha.

Parameter	Value	Source
Annual Increment in volume of wood, Iv ($m^3ha^{-1}year^{-1}$)	40	Source: IPCC –Table 3A.1.7, Annex 3A.1 (Average annual above ground net increment in volume in plantations by species) of IPCC GPG LULUCF 2003. Mean value between I V values of *E. urophylla*
Wood density, D	0.64	Source: IPCC – Table 3A.1.9-2 of Annex 3A.1 "Biomass Default Tables for Section 3.2 Forest Land" of IPCC Good Practice Guidance for LULUCF
Biomass Expansion Factor, BEF	3.4	Source: IPCC – Table 3A.1.10 of Annex 3A.1 "Biomass Default Tables for Section 3.2 Forest Land" of IPCC GPG LULUCF
Root-shoot-ratio, R	0.45	Source: IPCC – Table 3A.1.8 of Annex 3A.1 "Biomass Default Tables for Section 3.2 Forest Land" of IPCC GPG LULUCF

The I value used of 40 m3ha-1year-1 is the mean value between *E. urophylla* I values derived from Table 3A.7 of ANNEX 3A.1 "Biomass Default Tables for Section 3.2 Forest Land" of IPCC Good Practice Guidance for LULUCF.

To calculate the above and below-ground biomass, PP has used the equation 3.2.5 of the IPCC GPG LULUCF where G_{TOTAL} is the expansion of annual increment rate of above-ground biomass (G_W) to include its below ground part, involving multiplication by the ratio of below-ground biomass to above-ground biomass (often called the root to-shoot ratio (R)) that applies to increments. This may be achieved directly where G_W data are available as in the case of naturally regenerated forests or broad categories of plantation. In case GW data are not available, the increment in volume can be used with biomass expansion factor for conversion of annual net increment to aboveground biomass increment. Equation 3.2.5 shows the relationship:

EQUATION 3.2.5
AVERAGE ANNUAL INCREMENT IN BIOMASS

$G_{TOTAL} = G_W \bullet (1 + R)$

(A) In case aboveground biomass increment (dry matter) data are used directly. Otherwise G_W is estimated using equation B or its equivalent

$G_W = I_V \bullet D \bullet BEF_1$

(B) In case net volume increment data are used to estimate G_W.

Where,

G_{TOTAL} = average annual biomass increment above and below-ground, tonnes d.m. ha-1 yr-1 ;

G_W = average annual aboveground biomass increment, tonnes d.m. ha-1 yr-1 ;

R = root-to-shoot ratio appropriate to increments, dimensionless;

I_V = average annual net increment in volume suitable for industrial processing, m3 ha-1 yr-1;

D = basic wood density, tonnes d.m. m-3 ;

BEF1 = biomass expansion factor for conversion of annual net increment (including bark) to aboveground tree biomass increment, dimensionless;
In the Table below follows the calculation of average annual biomass increments above and belowground of *E. urophylla* and the mean value between them that was used to calculate the carbon stock of the Project (100% of Project plantation is composed by *E. urophylla)*.

Source	Annotations	Increment wood vol (m^3/ha/year) I_v	Wood density D	Biomass Exp Fact BEF_1	Incr. biomass Above (ton/ha/year) $G_W = I_v * D * BEF1$	Root-shoot ration R	Incramental Biomass AGB+BGB (ton/ha/year) $G_{total} = G_W*(1+R)$
IPCC-Table 3A.1.9	*E. urophylla*	40.00	0.65	3.4	88.40	0.45	128.18
PDD value	*E. urophylla*	40.00	0.65	3.4	88.40	0.45	128.18

Step 2: Mean tree biomass estimation

The estimation of the mean tree biomass per hectare in the tree biomass estimation strata was calculated according to the equation 13 of the AR tool "*Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities*":

$$\boldsymbol{B_{Tree} = A * b_{Tree}}$$

Where,

$\boldsymbol{A}$	Sum of areas of the tree biomass estimation strata; ha
$\boldsymbol{B_{Tree}}$	Tree biomass in the tree biomass estimation strata; t d.m.
$\boldsymbol{b_{Tree}}$	Mean tree biomass per hectare in the tree biomass estimation strata; t d.m. ha-1

Step 3: Mean tree carbon stock in terms of CO2e

The estimation of the mean carbon stock in trees within the tree biomass estimation strata was calculated according to the equation 12 of the AR tool "*Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities*":

$$C_{TREE} = \frac{44}{12} \times CF_{TREE} \times B_{TREE}$$

Where,

$\boldsymbol{C_{Tree}}$	Carbon stock in trees in the tree biomass estimation strata; t CO2e
$\boldsymbol{CF_{Tree}}$	Carbon fraction of tree biomass; t C (t d.m.)-1. A default value of 0.47 is used unless transparent and verifiable information can be provided to justify a different value.
$\boldsymbol{B_{Tree}}$	Tree biomass in the tree biomass estimation strata; t d.m.

Step 4: SOC - Soil Organic Carbon

Soil organic carbon (SOC) was estimated using AR Tool "E*stimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activity*", v1.1". As suggested by the tool, it is assumed that the implementation of the Project activity increases the SOC content of the lands from the pre-project level to the level that is equal to the steady-state SOC content under native vegetation. The increase in SOC content in the Project scenario takes place at a constant rate over a period of 20 years from the year of planting.

The initial SOC stock at the start of the Project is estimated as follows (equation 1 of the tool):

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

Where,

$SOC_{INITIAL,i}$ SOC stock at the beginning of the A/R CDM Project activity in stratum i of the Areas of land; t C ha-1

$SOC_{REF,i}$ Reference SOC stock corresponding to the reference condition in native lands (i.e. non-degraded. unimproved lands under native vegetation n normally forest) by climate region and soil type applicable to stratum i of the areas of land; t C ha-1

$f_{LU,i}$ Relative stock change factor for baseline land-use in stratum i of the areas of land; dimensionless

$f_{MG,i}$ Relative stock change factor for baseline management regime in stratum i of the areas of land; dimensionless

$f_{IN,i}$ Relative stock change factor for baseline input regime (e.g. crop residue returns. manure) in stratum i of the areas of land; dimensionless

i 1. 2. 3. … strata of areas of land; dimensionless

The values of the above parameters are given in the table below.

Parameter	Symbol	Value	Source: SOC estimation tool
Reference SOC (tC/ha)	$SOC_{REF,i}$	47	Table 3 of the tool; Tropical moist, Soils with low activity clay (LAC)
Land use factor	$f_{LU,i}$	1	Table 6 of the tool; All Permanent grassland.
Management factor	$f_{MG,i}$	0.97 (tropical)	Table 6 of the tool; Overgrazed or moderately degraded grassland, with somewhat reduced productivity (relative to the native or nominally managed grassland) and receiving no management inputs
Input factor	$f_{IN,i}$	1.11	Table 6 of the tool; Grasslands with direct application of fertilizers - organic or inorganic
SOC at the beginning of the Project activity	$SOC_{initial,i}$	50.6	Calculated, with Eq. Above described

Then, the rate of change in SOC stock in Project scenario until the steady-state is reached is estimated using Equation 6 of the tool

$$dSOC_{t,i} = \frac{SOC_{REF,i} - (SOC_{INITIAL,i} - SOC_{LOSS,i})}{20\ years} \quad \text{for } t_{PREP,i} < t \leq t_{PREP,i} + 20$$

Where,

$dSOC_{t,i}$ The rate of change in SOC stock in stratum i of the areas of land. in year t; t C ha-1 yr-1.

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

In the case of the soil disturbance attributable to Project activity and for which the total area disturbed, over and above the area is less than 10% of the area of the stratum. Then the carbon loss is assumed as zero. The application of these equations results in an estimated rate of 0.80 t C ha yr-1 in soil organic carbon.

The change in SOC stock for all the strata of the areas of land, in year t. is calculated as indicated in equation 8 of the tool.

$$\Delta SOC_{AL,t} = \frac{44}{12} * \sum_{i} A_i * dSOC_{t,i} * 1year$$

Where:

$\Delta SOC_{AL,t}$	Change in SOC stock in areas of land meeting the applicability conditions of this tool, in year t; t CO2-e
A_i	The area of stratum i of the areas of land; ha
$dSOC_{t,i}$	The rate of change in SOC stocks in stratum i of the areas of land; t C ha-1 yr-1
i	1, 2, 3, strata of areas of land; dimensionless

Step 5: Dead Wood

Not considered.

Step 6: Litter

Not considered.

Step 7: Change in the carbon stocks in Project

Change in the carbon stocks in Project occurring in the selected carbon pools in year t has been calculated using equation 3 of AR-ACM0003 methodology:

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

Where,

$\Delta C_{TREE\_PROJ,t}$	in carbon stock in tree biomass in Project in year t, as estimated in the tool "*Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM Project activities*"; t CO_2-e
$\Delta C_{SHRUB\_PROJ,t}$	Change in carbon stock in shrub biomass in Project in year t, as estimated in the tool "*Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities*"; t CO_2-e. Not considered.
$\Delta C_{DW\_PROJ,t}$	Change in carbon stock in dead wood in project in year t, as estimated in the tool "*Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities*"; t CO_2-e. Not considered .
$\Delta C_{LI\_PROJ,t}$	Change in carbon stock in litter in project in year t, as estimated in the tool "*Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities*"; t CO_2-e. Not considered.
$\Delta SOC_{AL,t}$	Change in carbon stock in SOC in project, in year t, in areas of land meeting the applicability conditions of the tool "*Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities*", as estimated in the same tool; t CO_2-e

Changes in the carbon stock will be measured and documented during each verification as per the sampling procedures.

Step 8: Actual net GHG removals by sinks

The actual net GHG removals by sinks are calculated using equation 2 of the AR-ACM0003 methodology as follows:

$$\Delta C_{ACTUAL,t} = \Delta C_{P,t} - GHG_{E,t}$$

Where,

$\Delta C_{ACTUAL,t}$	Actual net GHG removals by sinks, in year t; t CO_2e.
$\Delta C_{P,t}$	Change in the carbon stocks in project, occurring in the selected carbon pools, in year t; t CO_2e.
$GHG_{E,t}$	Increase in non-CO_2 GHG emissions within the project boundary because of the implementation of the A/R CDM project activity, in year

t, as estimated in the tool "*Estimation of non-CO_2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity*"; t CO_2e.

Since,
$\mathbf{GHG_{E,t}} = \mathbf{0}$ (refer section 3.3.7.2 for the same)

$$\Delta \mathbf{C_{Actual,t}} = \mathbf{C_{p,t}}$$

The calculated actual emission reduction = 16,272,128 tCO_2e for the whole project life i.e. 30 years. Yearly average emission reduction by the project is 542404.27 tCO_2e

Step 9: Net Anthropogenic GHG removals by sinks

According to the equation 5 of the AR-ACM0003 methodology, the net anthropogenic GHG removals by sinks shall be calculated as follows:

$$\Delta C_{AR-CDM,t} = \Delta C_{ACTUAL,t} - \Delta C_{BSL,t} - LK_t$$

Where,

$\Delta C_{AR-CDM,t}$	Net Anthropogenic GHG removals by sinks, in year *t*; t CO2-e
$\Delta C_{ACTUAL,t}$	Actual net GHG removals by sinks, in year *t*; t CO2-e
$\Delta C_{BSL,t}$	Baseline net GHG removals by sinks, in year *t*; t CO2-e
LK_t	Leakage GHG emissions, in year *t*; t CO2-e

Since,

$\Delta C_{BSL,t}$ and LK_t is zero for the project

Hence,

$$\Delta C_{AR-CDM,t} = \Delta C_{ACTUAL,t}$$

The calculated Net Anthropogenic GHG removals by sinks = 16,058,589 tCO_2e for the whole project life i.e. 30 years. Yearly average emission reduction by the project is 5,35,286 tCO_2e

The ER calculation excel sheet submitted by the PP was evaluated and found to appropriate and in line with the applied methodology.

	Ex ante net anthropogenic GHG emission reductions tCO_2e

Total	16,058,589
Average	5,35,286

CAR 16 and CAR 17 were raised and resolved successfully. Refer Appendix 2 for the same. Documents referred /10//11//4//5//37//63//64/ and /65/.

3.3.8 Monitoring Plan

The VVB team checked all parameters presented in the monitoring plan against the requirements of the methodology and was found that all the parameters are as per methodology.

The monitoring plan in section 3.3.3 of the validate PD is confirmed as designed according to the methodology and applicable tool. Monitoring of the project condition is responsibility of TFA. To assure the most effective monitoring of the activities of the Project, areas will be divided in brigades to better manage the extent of the Project Area and LMA. Brigade leaders will oversee the activities and compile and analyze the results from monitoring patrols.

The activities of the Project and their monitoring is grouped by the PP as following:

Forest monitoring: will be conducted by forest monitoring patrols. On a monthly basis, brigade leaders will perform random site visits to verify that monitoring patrols are covering the assigned area and that each patrol is wearing the adequate field equipment. Brigade leaders should fill up a report that will be submitted to the TFA/ARC's office in Paragominas.

Biodiversity monitoring: will be undertaken by biodiversity monitoring squads. These patrols should follow approved monitoring protocols (by ARC) and make reports every two weeks.

Social Monitoring: will be undertaken by social monitoring squads. There will be a responsible for each monitoring squad who will generate monthly activities reports.

Climate parameters to be monitored

Sl. No.	Data/Parameter	Unit	Description	Determination method
1	A	Hectare (ha)	Project area	Boundaries delineated and fixed using Geographical Information Systems (GIS)
	Mean annual Increment in Volume (I) V	$_{m}3_{ha}$-1_{yr}-1	It is the average annual net increment in volume suitable for industrial processing and it's used to calculate the average annual above-ground biomass increment (Gw)	In line with the applied methodology and calculated as per the IPCC GPG LULUCF guideline which is an acceptable standard and guideline
2	Wood	t d.m./m3	Wood density is used to	In line with the applied

	density (D)		convert the commercial tree volume into tree biomass.	methodology and calculated as per the IPCC GPG LULUCF guideline which is an acceptable standard and guideline
3	DBH	cm	Equation to estimate the Diameter at Breast Height of trees and shrubs on the function of the age.	Measured and calculated according to requirements of the applied methodology
4	Average annual above-ground biomass increment (Gw)	t ha-1yr-1	Reference of mean annual aboveground biomass for tropical and subtropical moist forest with a short dry season, corresponding to the reference land.	In line with the applied methodology and calculated as per the IPCC GPG LULUCF guideline which is an acceptable standard and guideline
5	Biomass equation	T	Equation to estimate the biomass of trees of eucalyptus on the function of basal area per tree.	Measured and calculated according to requirements of the applied methodology
6	Biomass equation	Kg	Equation to estimate the biomass of trees of Eucalyptus on the function of DBH.	Measured and calculated according to requirements of the applied methodology
7	Carbon Fraction of dry matter (CF)	tC t d.m -1	Biomass proportion corresponding to carbon. CF is used to convert biomass to carbon.	In line with the applied methodology and calculated as per the IPCC GPG LULUCF guideline which is an acceptable standard and guideline
8	CO2e	tC-1	Factor applied to convert the tree carbon sequestered to tree CO2e sequestered.	In line with the applied methodology and default value considered as per the IPCC GPG LULUCF guideline which is an acceptable standard and guideline
9	Root-Shoot-Ratio (R)	Dimensionless	Ratio of the weight of the roots to the weight of the top of the tree. Used for belowground tree biomass estimation.	In line with the applied methodology and default value considered as per the IPCC GPG LULUCF guideline which is an acceptable standard and guideline
10	Biomass Expansion Factor (BEF)	Dimensionless	Ratio of aboveground oven-dry biomass to oven-dry biomass of the steam.	In line with the applied methodology and default value considered as per the IPCC GPG LULUCF

				guideline which is an acceptable standard and guideline
11	Reference SOC ($SOC_{REF,i}$)	tC ha-1	Reference Soil Organic Carbon stock corresponding to the reference condition in native lands (i.e. non-degraded, unimproved lands under native vegetation, normally forest) by climate region and soil type applicable to stratum i of the areas of land.	Default value considered as per the tool referred "Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities" v1.1 in the applied methodology
12	Land Use Factor ($f_{LU,i}$)	Dimensionless	Relative stock change factor for baseline land use in stratum i of the areas of land.	Default value considered as per the tool referred "Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities" v1.1 in the applied methodology
13	Management Factor (fMG,i)	Dimensionless	Relative stock change factor for baseline management regime in stratum i of the areas of land;	Default value considered as per the tool referred "Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities" v1.1 in the applied methodology
14	Input Factor (fIN,i)	Dimensionless	Relative stock change factor for baseline input regime (e.g. crop residue returns, manure) in stratum i.	Default value considered as per the tool referred "Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities" v1.1 in the applied methodology
15	SOCinitial,i	t C ha-1	SOC at the beginning of the project activity in stratum i.	Default value considered as per the tool referred "Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities" v1.1 in the applied methodology
16	Ai	ha	Area of stratum i	Stratification for *ex post* estimations is based on the actual implementation of the project planting/management plan. Field measurement done and validated

Community parameters to be monitored

Sl. No.	Data/Parameter	Unit	Description	Determination method
1	Number of trained people in biodiversity and forest monitoring.	Number/ year	Number of performed courses and training	Questionnaires and attendance list applied to participants
2	Number of people participating in the monitoring activities each month.	Number/ year	Number of families participating in REDD+ Project activities	Monitoring report and annual report
3	Number of people returning to the monitoring work positions after one rotation	Number/ year	Number of families participating in REDD+ Project activities	Monitoring report and annual report
4	Number of community leaders trained to improve their level of organization, management and democratic governability	Number/ year	Number of performed courses and training	Questionnaires and attendance list applied to participants
5	Number of local leaders participating in the development of an organization system	Number/ year	Number of families participating in REDD+ Project activities	Monitoring report and annual report
6	Number of local associations/organizations strengthened by the project activities	Number/ year	Number of local associations/organizations directly involved in REDD+ Project activities	Monitoring report and annual report
7	Number of people trained in agroforestry techniques	Number/ year	Number of performed courses and training	Questionnaires and attendance list applied to participants
8	Number of implemented agroforestry pilot projects	Number/ year	Number of agroforestry pilot initiated due to the REDD+ project	Monitoring report and annual report
9	Number of people trained in the use of efficient improved cooking stoves	Number/ year	Number of performed courses and training	Questionnaires and attendance list applied to participants

10	Number of improved cooking stoves pilots implemented in local families	Number/ year	Number of cookstoves pilot initiated due to the REDD+ project	Monitoring report and annual report
11	Number of people trained in the sustainable small scale timber extraction	Number/ year	Number of performed courses and training	Questionnaires and attendance list applied to participants
12	Number of people trained in the development and management of a small scale enterprise	Number/ year	Number of performed courses and training	Questionnaires and attendance list applied to participants
13	Number of small scale enterprises developed in the project area	Number/ year	Number of small enterprises initiated due to the project	Monitoring report and annual report
14	Number of children received education in the project area	Number/ year	Number of children received education due to project	Monitoring report and annual report
15	Annual health check-ups and medicine distribution	Number/ year	Number of people treated in an around the project area	Monitoring report and annual report

Biodiversity parameters to be monitored

Sl. No.	Data/Parameter	Unit	Description	Determination method
1	Number of trees sampled	Number/ year	Quantity of tree species monitored	Field data sheets and monitoring report
2	Total project area	Ha	Area increased through restoration of degraded land due to the project	Monitoring report and annual report
3	Reduction in soil erosion	Ha	Area undertaken plantation under the project	Monitoring report and annual report
4	Increase in biodiversity (Flora)	Ha	Number of flora species monitored under the project	Monitoring report and annual report
5	Increase in biodiversity (Fauna)	Ha	Number of fauna species monitored under the project	Monitoring report and annual report
6	Increased natural regeneration in	Ha	Area regenerated under the legal	Monitoring report and annual report

	Legal Reserve		reserve due to the project activity	
7	Frequency and intensity of fires	Ha	No. of events and affected hectares	Monitoring report and annual report

Monitoring reports should be numbered and filed appropriately. Once a month monitoring reports should be scanned to have digital copies in an archive as backup. Maps, reports and records will be available to validators at each verification event.

The Project is not expected to generate any type of leakage.

The Project will follow the methods from IPCC GPG for LULUCF, GPG 2003, and the modalities and procedures for A/R project activities to estimate baseline net GHG removal by sinks, leakage, actual net GHG removal by sinks, and net anthropogenic removal by sinks.

The step has explained in detail in sections 3.3.3, 4.4.1 and 5.4.1 of the validated PD /10/.

CAR 18 were raised and resolved successfully. Refer Appendix 2 for the same. Documents referred /10//11//4//5//37//63//64/ and /65/.

3.3.9 Dissemination of Monitoring Plan and Results (CL4.2)

It will be through the website of TFA/ARC group that the monitoring plan, as well as its results obtained will be available to the public on internet /39/. This has been validated during the site visit and personal interview with the management team of the project.

CAR 19 were raised and resolved successfully. Refer Appendix 2 for the same. Documents referred /10/ and /39/.

3.3.10 Non-Permanence Risk Analysis

Not applicable

3.3.11 Optional Gold Level: Regional Climate Change Scenarios (GL1.1)

Not applicable

3.3.12 Optional Gold Level: Climate Change Impacts (GL1.2)

Not applicable

3.3.13 Optional Gold Level: Measures Needed and Designed for Adaptation (GL1.3)

Not applicable

3.4 Community

3.4.1 Descriptions of Communities at Project Start (CM1.1)

The step is explained in section 4.1.1 of the validated PD. It was confirmed from the onsite observation that no community, community groups or indigenous groups prior to the Project or after the project resides inside the project area. The only people who lived in the farm were the property keeper and his family. There are communities residing near the project area (mentioned in section 2.1.8 and 2.1.9 of the PD). The surveys conducted in the RR and project area to assess the socio-economic condition i.e. family income, livelihood, health, education, of the people residing inside and outside the project area and analyse the impact they have and they could have on the project area's forests.

The major issues identified are:

The main factors that occur in the region and contribute negatively to the development of local communities and forests in the area are:

- Decline in productivity and profitability of traditional agriculture and livestock.
- Lack of work and income generation options in the region
- High poverty rate
- Issue in transport system
- Gender inequality
- Poor health services

Inefficiency by the government to promote sustainable productive activities, order the occupation of the territory and meet the main demands of the communities for health, housing, education and leisure.

The project aims to have long and short-term impacts on the communities include increasing the number of forest workers and promoting professional expertise, increasing their incomes and promote improvements in professional career.

Reference documents like minutes of meetings of the consultations /31//32//34//41/ and /42/, PRAs report /25/ and site visit interviews with the local forest officers, small ranchers, farmers and squatters in rural areas, employees of the property, representatives of the local residents confirmed all these aspects.

3.4.2 Interactions between Communities and Community Groups (CM1.1)

The PD /10/ section 4.1.2 states observe a good interaction between communities and community groups, the interaction occurs due to the geographic proximity between them, so the relationship of the outer distant communities of the nuclei is considered incipient and/or superficial due to the geographic distance and the absence of common activities to be carried out jointly by the communities. However, the project may encourage and increase to provide the

proximity and interaction between communities and community groups inside and outside the project boundary. It is verified by site visit interviews with the local officers and stakeholders.

CAR 20 was raised and resolved successfully. Refer Appendix 2 for the same. /10//25//31//32//34//36//41//42/ and /45/.

3.4.3 High Conservation Values (CM1.2)

Community well-being high conservation value areas identified in section 4.1.3 of the PD /10/. The same has been discussed with the local residents and stakeholders.

CAR 21 was raised and resolved successfully. Refer Appendix 2 for the same. /10//31//32//34//45//36//25/ and /56/.

3.4.4 Without-Project Scenario: Community (CM1.3)

As per the socioeconomic baseline /36/ of the project, without the project land use scenario will be continuation of grazing and agriculture activities which will lead to further deforestation of the forests land. This was confirmed by checking and assessing the socioeconomic survey reports & data and interview with local communities. The local farmers cannot improve their well-being in terms of salary, livelihood and skills, this is also confirmed during the site visit as no person in the communities have knowledge about the use of alternative land use practice except agriculture and grazing. This is explained in detail in section 4.1.4 of the validated PD.

3.4.5 Expected Community Impacts (CM2.1)

This is explained in detail in section 4.2.1 of the validated PD. From the supporting documents submitted (like socioeconomic survey report /36/, PRA reports /25/, communities comments received during the consultations /31//32/ and /34/) and on site discussions & observations, no negative impacts on identified stakeholders are expected. In fact, the project will have positive impacts of the project impact on areas outside the project area and therefore actors who are not involved directly in the project.

CAR 22 was raised and resolved successfully. Refer Appendix 2 for the same. Documents referred /10//31//32//34//45//36/ and /25/.

3.4.6 Negative Community Impact Mitigation (CM2.2)

Based on ARC A/R project theory of change there are no negative community impacts observed and hence there is no need for mitigation. This was validated from the supporting documents submitted (like socioeconomic survey report /36/, PRA reports/25/, communities comments received during the consultations /31//32/ and /34/) and on site discussions & observations,

3.4.7 Net Positive Community Well-Being (CM2.3, GL1.4)

The step is explained clearly in section 4.2.3 of the PD /10/. The PD states that the project will generate positive community impacts through

- Improved socio-economic condition- By increasing local job opportunities, diversification of livelihood and capacity building and awareness generation regarding market value chain of agricultural and other products. .

- Skill development – by capacity building of communities for alternative land use practice i.e. agroforestry which will again generate additional livelihood option and source of income to the local communities, technical strengthening and know-how for forest and biodiversity monitoring.

- Health - Improved health benefits especially for women and children by introducing improved cookstoves. For easy and quick accessibility of medicines, the project will also provide a service of medicine storage in the project site. Diversified livelihood activities and agroforestry practices provides food security.

- Protected green cover in the project area which will improve and protect microclimate

- Education – the Project provide many skill building trainings related to sustainable forest management and industrial health and safety and literacy for adults (senior secondary education).

- Increased interaction and exchange of ideas between communities inside and outside the project boundary. This will help in better land use management and protection of forest in the PA.

- Better understanding of the importance of protecting the forest and how forest conservation will benefit their livelihoods and overall well-being

Descriptions in PD has been checked, it is verified that the information on the community groups in baseline scenario is correct via checking the socioeconomic survey report /36/, PRA reports /25/ and onsite observations and discussions with the local stakeholders of the project.

3.4.8 High Conservation Values Protected (CM2.4)

This is explained in section 4.2.4 of the validated PD /10/. The HCVs related to community well-being will not be negatively affected by the project; on the contrary, only positive impacts are expected. The project is designed to protect and conserve these areas from misuse, enhance community understanding of their value and to improve overall community well-being.

Descriptions in PD has been checked, it is verified that the information on the community groups in baseline scenario is correct via checking the socioeconomic survey report /36/, PRA reports /25/ and onsite observations and discussions with the local stakeholders of the project.

3.4.9 Impacts on Other Stakeholders (CM3.1)

This is explained in detail in section 4.3.1 of the validated PD /10/. The project is designed to generate only positive impacts to the stakeholders living in the LMA and other near-by communities. The project won't generate negative impacts to those living outside the 3 Km buffer

identified during the PRAs. No other stakeholders have been identified to use or depend from the resources in the project area.

Descriptions in PD /10/ has been checked, it is verified that the information on the community groups in baseline scenario is correct via checking the socioeconomic survey report /36/, PRA reports /25/ and onsite observations and discussions with the local stakeholders of the project.

CAR 23 was raised and resolved successfully. Refer Appendix 2 for the same. Documents referred /10//31//32//34//45//36/ and /25/.

3.4.10 Mitigation of Negative Impacts on Other Stakeholders (CM3.2)

Not applicable

3.4.11 Net Impacts on Other Stakeholders (CM3.3)

As shown in 4.3.1 and 4.3.2 of the validated PD /10/ and above section of this report, the project is anticipated to generate positive impacts on the other stakeholders and no negative impacts, hence leaving a net positive impact overall.

Descriptions in PD has been checked, it is verified that the information on the community groups in baseline scenario is correct via checking the socioeconomic survey report /36/, PRA reports /25/ and onsite observations and discussions with the local stakeholders of the project.

3.4.12 Community Monitoring Plan (CM4.1, CM4.2, GL1.4, GL2.2, GL2.3, GL2.5)

The PP established a detailed community monitoring plan in section 4.4.1 of the validated PD /10/. The parameters to be monitored are detailed in Section 3.3.8 of this report.

The VVB has assessed the monitoring plan and found that monitoring indicators are confirmed as consistent with the net positive change which created by the project. Also, in order to develop the social-environmental indicators for the results, several communitarian workshops will take place as a fundamental part of the Social Communitarian Monitoring System that will facilitate the follow-up and evaluation of the benefits of the project to improve the quality of life of the communities. This system will have trained communitarian monitors that will continuously carry out the follow up activities evaluating the commitments, project activities and communities every 3 to 6 months. Also, the communitarian impacts monitoring plan will carry out an exhaustive annual assessment of the indicators.

The monitoring plan aims at creating an association and mutual responsibility sense between the project and local communities in the management of social environmental impacts, as well as improving the perception of the social responsibility adopted by the project. The monitoring survey will be conducted as per the SOPs /13/. This is was confirmed during the on-site visit and the interview with the management team.

The community monitoring planned is deemed reasonable and appropriate.

3.4.13 Monitoring Plan Dissemination (CM4.3)

It will be through the website of TFA/ARC group that the monitoring plan, as well as its results obtained will be available to the public on internet /39/. This is confirmed during the site visit and the interview with the PP, project partner and local stakeholders.

3.4.14 Optional Gold Level: Exceptional Community Criteria (GL2.1)

Not applicable

3.4.15 Optional Gold Level: Short-term and Long-term Community Benefits (GL2.2)

Not applicable

3.4.16 Optional Gold Level: Community Participation Risks (GL2.3)

Not applicable

3.4.17 Optional Gold Level: Marginalized and/or Vulnerable Community Groups (GL2.4)

Not applicable

3.4.18 Optional Gold Level: Net Impacts on Women (GL2.5)

Not applicable

3.4.19 Optional Gold Level: Benefit Sharing Mechanisms (GL2.6)

Not applicable

3.4.20 Optional Gold Level: Benefits, Costs, and Risks Communication (GL2.7)

Not applicable

3.4.21 Optional Gold Level: Governance and Implementation Structures (GL2.8)

Not applicable

3.4.22 Optional Gold Level: Smallholders/Community Members Capacity Development (GL2.9)

Not applicable

3.5 Biodiversity

3.5.1 Existing Conditions (B1.1)

The Project has a primary focus on to reforest and restore degraded and deforested land between the critical mass forest areas (most of the project area, which is verified by cross checking survey and ecological report, on-site observation and interview with local officers and residents /41//56/ and /63/). The project is located in the northern part of the Brazil, State of Para. The dominant vegetation in this region is humid forest with predominantly oxisols perenefólia and

Ultisols soils. The Project Area is home to many endemic, vulnerable and endangered populations of flora and fauna and an "ecological corridor" role, which connects several Conservation Units and many conservation priority species. Large areas of forest in the project reference area have been replaced by pasture, and more recently by soybean cropland. The number of Endangered and Vulnerable species recorded in the area was significant, according to the International Union for the Conservation of Nature (IUCN 2014) of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES 2014),

Common activities practiced are livestock development which leads for grazing and expansion of the agricultural frontier, Illegal logging and township expansion; all these activities are practiced traditionally for survival of communities. These activities led to mass scale deforestation. This is general management practices in the area and are detrimental to natural resources. This in turn affects gradually the loss of soil fertility, increase erosion and decrease topsoil, and as a result, a decrease in productivity of forest and agriculture lands. It also has direct negative impacts on flora and fauna. Large areas of forest in the Project's Reference Area have been replaced by pasture, and more recently by soybean cropland. In the future, rates of deforestation are likely to increase as more roads are built through the region's core and as international demand for tropical timber, soybeans, beef, and biofuels continues to grow.

The above-mentioned activities are resulting to deforestation of native forest, forest fragmentation and reduction of ecological corridors. Due to these activities the area has lost and will lose many endemic species of flora and fauna which will cause ecological imbalance.

The ARC AR Project restore, enhance and protects the forestland for the benefit of local communities and biodiversity. Project has created the concept of animal corridor by the constructing the bridges for Capuchin monkey, which were very common in and around the project area but now to the increased rate of deforestation which are under threat and have been listed under endangered species under IUCN.

Existing conditions of biodiversity identified in section 5.1.1 of the validated PD. The section provides a complete description with the relevant species of flora and fauna. The FAO, IUCN sources and other scientific research papers referred were checked and assessed by the VVB to confirm the description provided in the PD /10/.

3.5.2 High Conservation Values (B1.2)

Biodiversity HCVs information is detailed in section 5.1.2 of the validated PD /10/. To identify HCVs in the PD, the guidelines for identification, management and monitoring of high values were considered by the PP, as stated in the "General Guide for the Identification of High Conservation Values" (BROWN et al., 2013) /61/, "Common Guidance for the Management & Monitoring of High Conservation Values" (BROWN, SENIOR, 2014) /56//57/, "FSC Principles and Criteria for Forest Stewardship" (FSC, 2012) /55/ and "The Climate, Community and Biodiversity Alliance" (CCBA, 2013) /8/. The project description and IUCN red list were assessed to confirm the same by the VVB.

3.5.3 Without-project Scenario: Biodiversity (B1.3)

The step has been explained in detail in section 5.1.3 of the validated PD /10/. In the absence of the project the BAU scenario would have continued i.e. 39,150 ha of forest land will be deforested

in the Project Area during the thirty years of the project which is a biodiversity hotspot. This would have resulted in huge loss of biodiversity.

This was confirmed by checking and assessing the climate and biodiversity baseline data /58/ and interview with local experts and communities.

3.5.4 Expected Biodiversity Changes (B2.1)

The expected biodiversity impact of the project is positive and will help the protection and enhancement of biodiversity. The impacts are listed in detail in section 5.2.1 of the validated PD.

This was confirmed by checking and assessing the climate and biodiversity baseline data /58/ and interview with local experts and communities.

3.5.5 Mitigation Measures (B2.3)

Mitigation measures as discussed across the PD to conserve and enhance the forests and biodiversity of the project area are consistent with the standard practices and sufficient to achieve the project aim.

This was confirmed by checking and assessing the climate and biodiversity baseline data /58/ and interview with local experts and communities.

3.5.6 Net Positive Biodiversity Impacts (B2.2, GL1.4)

From the PD /10/ section 5.2.3 the VVB concludes that project's anticipated net impacts on biodiversity in the project zone will be positive compared with conditions under the without-project land use scenario.

This was confirmed by checking and assessing the climate and biodiversity baseline data /58/ and interview with local experts and communities.

3.5.7 High Conservation Values Protected (B2.4)

Checking and assessing the climate and biodiversity baseline data /58/ and interview with local experts and communities the VVB concluded that the project will not negatively affect any biodiversity-related HCVs

3.5.8 Species Used (B2.5)

The PP has ensured and encouraged plantation of native species is used for plantation. The species used and detailed in the section 5.2.5 of the validated PD /10/. This was assessed and validated during the site visit in interviews with project officers and communities.

3.5.9 Impacts of Non-native Species (B2.6)

None of the Project's activities will introduce invasive species or genetically modified organisms. This is validated by checking the plantation records /59/ and interview with community during the site visit.

3.5.10 GMO Exclusion (B2.7)

No GMO used in the project. This is validated by checking the plantation records /59/ and interview with community during the site visit.

3.5.11 Inputs Justification (B2.8)

Not applicable

3.5.12 Waste Products (B2.9)

Not applicable

3.5.13 Negative Offsite Biodiversity Impacts (B3.1) and Mitigation Measures (B3.2)

No potential negative offsite biodiversity impacts have been identified and therefore no measures or activities have been developed. This was confirmed by checking and assessing the climate and biodiversity baseline data /58/ and interview with local experts and communities.

3.5.14 Net Offsite Biodiversity Benefits (B3.3)

No potential negative impacts have been identified due to the environmental-friendly techniques adopted in the proposed project activity. This was confirmed by checking and assessing the climate and biodiversity baseline data /58/ and interview with local experts and communities.

3.5.15 Biodiversity Monitoring Plan (B4.1, B4.2, GL1.4, GL3.4)

The biodiversity monitoring plan is detailed in section 5.4.1 of the PD /10/. It is of the opinion of the VVB the biodiversity monitoring plan is appropriate and it meets the requirements of B4.1 and B4.2 of the CCB standard /8/.

3.5.16 Biodiversity Monitoring Plan Dissemination (B4.3)

It will be through the website of TFA/ARC group that the monitoring plan, as well as its results obtained will be available to the public on internet /39/. This is confirmed during the site visit and the interview with the PP, project partner and local stakeholders.

3.5.17 Optional Gold Level: High Biodiversity Conservation Priority Status (GL3.1)

Not applicable

3.5.18 Optional Gold Level: Trigger Species Population Trends (GL3.2, GL3.3)

Not applicable

4 VALIDATION CONCLUSION

Amazon Reforestation Consortium has contracted the 4KES to validate the project: “The ARC A/R Project” in Brazil” with regard to VCS Standard v4 and CCB Standard v3.1 requirements and

the information provided by the project proponent related to the project design, operation, monitoring and reporting.

A risk-based approach has been followed to perform this validation. In the course of the validation 26 CARs, 03 CLs were raised and successfully closed. No Forward Action Request has been raised in the validation.

No limitations or doubts were identified related to the validation of the project.

4KES has reviewed the project description documents and subsequently carried out site visit interviews to confirm the fulfilment of stated criteria.

The project activity has correctly applied the baseline and monitoring methodology "AR-ACM0003. Afforestation and reforestation of lands except wetlands, v2.0, which is an approved methodology under the VCS programme and is acceptable under VCS Version 4. The baseline has been determined in accordance with the stated approved baseline methodology.

As summary the validation team able to conclude that:

- The project is in line with all relevant host country criteria (Brazil) and all relevant VCS version 4 program guidelines requirements.
- The project additionality is sufficiently justified in the VCS PD.
- The monitoring plan is transparent and adequate and in line with applied baseline and monitoring methodology of AR-ACM0003, v2.0.
- The calculation formulae and use of parameter for the project emission reductions estimation are transparent and in line with the requirement of the applied methodology. The ex-ante projection of emission reductions given is found to be appropriate, conservative and in line with the requirement. The estimated Emission Reductions during the crediting period by the Project is expected to be 16,272,128 tCO_2e over the 30 year project lifetime.
- The conclusions of this report show, that the project, as it was described in the project documentation, is in line with all criteria applicable for the validation as outlined under VCS Standard v4 and CCB Standard v3.1

Therefore, 4KES is able to certify that the project meets all relevant requirements of the above-defined criteria and recommend registration of the project activity.

Approved by:
Chandrakala R.

Director
4K Earth Science Private Limited

Date: 06-Dec-2020
Place: Bangalore, India

APPENDIX 1: DOCUMENTS REVIEWED DURING VALIDATION

Ref. No	Title of Document	Version	Date
1	VCS Program Guide	4.0	19/09/2019
2	VCS Standard	4.0	19/09/2019 (updated 09/03/2020)
3	VCS Validation and Verification Manual	3.2	19/10/2016
4	CDM AR-ACM0003. Afforestation and reforestation of lands except wetlands. Version 2.0.	1.1	03/12/2012
5	Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities";	1.0	-
6	VCS+CCB Project Development Process	3.0	26/11/2012
7	CCB Program Rules	3.1	21/06/2017
8	CCB Standard	3.1	21/06/2017
9	CCB VCS Project Description Template	CCBv3.0_VCSv3.3	-
10	Project Description (PD)	1.0	12/05/2019
		2.0	28/05/2019
		3.0	02/06/2020
		4.0	08/10/2020
		5.0	15/11/2020
11	Emission Reductions Calculation Spread sheet	1.0	12/05/2019
		2.0	28/05/2019
12	VERRA webpage with global consultation https://www.vcsprojectdatabase.org/#/pipeline_details/PL1969		29/10/2019 to 28/11/2019
13	Standard Operating Procedures (SOPs)-Monitoring - ARC A/R Project	-	-
14	Shape files – Project Area	-	-
15	MoU signed between ARC and TFA	-	-
16	Kml file of geographical coordinates	-	-
17	**Research papers and references** – 1. Rodrigues et al. (2013), 2. EMBRAPA, 1988, 3. Viera (1988), 4. MMA, 2006, 5. Mesner & Wooldridge (1964), 6. Góes (1995), 7. Del'Arco & Mamede (1985), 8. Soares-Filho et al., 2006 9. Laurance et al., 10. 2001; Carvalho et al., 2002; 11. Soares-Filho et al., 2006 12. Nepstad et. al., 2008 13. Kirby, K. R., et. al., 2006 *14. Smeraldi, R., and A. Veríssimo. 1999* 15. *Lele, U.,* et. al., 1999 *16. Fearnside, Philip. (2005).*	-	-

	17. USD/ BRAZILIAN REAL exchange rate (2011-2016) Source: http://br.advfn.com/bolsa-de-valores/fx/USDBRL/Diagram *18. IPC inflation rates (2010-2016 period). http://pt.global-rates.com/estatisticas-economicas/inflacao/indice-de-precos-ao-consumidor/ipc/Brazil.aspx* *19. Instituto de Economia Agricola - IEA, 201664, www.iea.sp.gov.br/out/florestas.php* *20. interest rates applied by brazilian credit institutes in 2016, per month and per year (Banco Do Brazil 2016* 21. Claudio Araujo, Catherine Araujo Bonjean, 2009. Property rights and deforestation in the Brazilian Amazon. Ecological Economics, vol. 68:8-9(2461-2468). 22. Margulis, Sergio. 2004. Causes of Deforestation of the Brazilian Amazon. World Bank Working Paper; No. 22. Washington, DC: World Bank *23. http://www.florestal.gov.br/snif/recursos-florestais/as-florestas-plantadas*		
18	Maps showing location of communities	-	-
19	Maps showing any high conservation value (HCV) areas	-	-
20	Offsite project impact area	-	-
21	State Law n. 3,225, dated 04-01-1965	-	-
22	State Law n. 5,087, of 09-14-1983	-	-
23	State Law n. No. 5,450, dated 05-05-1988	-	-
24	ARC marketing studies	-	-
25	Participatory Rural Appraisal (PRA) reports		05/01/2016
26	ibge.gov.br website	-	-
27	Vertices_Glebas_Para.shp	-	-
28	IBGE"s 2010 Census data	-	-
29	VCS AFOLU Requirements	3.6	21/06/2017
30	Website - UN Sustainable Development Goals (www.undp.org)	-	-
31	Minutes of meeting (conducted on 25th June 2016)	-	25/06/2016
32	Workshop records - Climate change adaptation workshop and presentation of climate change	-	03/08/2016
33	Biodiversity monitoring plan – implementation record	-	21/07/2017
34	Minutes of Meeting - Stakeholders consultation	-	28/06/2017
35	Resource Management Plan	-	10/05/2018
36	Socioeconomic survey report	-	17/11/2018
37	Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities	4.2	-
38	Existing laws, regulations and governance arrangements of Brazil - http://domhelder.edu.br/revista//index.php/veredas/article/viewFile/1316/24704	-	-
39	ARC company details	-	-

40	ARC Project Financial Excel sheet	-	-
41	Attendance sheets – stakeholder consultations/workshop conducted on 25/06/2016, 03/08/2016 and 28/06/2017	-	-
42	Photographs – stakeholder consultations/workshop conducted on 25/06/2016, 03/08/2016 and 28/06/2017	-	-
43	ARC - HR Policy	-	-
44	ARC - Grievance Policy	-	-
45	Training records under the ARC A/R Project	-	-
46	ARC – Recruitment Policy	-	-
47	ARC – Code of Conduct	-	-
48	Employment records – ARC A/R Project	-	-
49	ARC – Safety and occupational health	-	-
50	ARC – Annual financial audit reports		From 2016 – 2019
51	Project area land records		
52	ARC Declaration letter – Management of double counting		02/03/2020
53	Landsat TM images	-	-
54	Google earth images of project area	-	-
55	FSC Principles and Criteria for Forest Stewardship" (FSC, 2012)	-	-
56	General Guide for the Identification of High Conservation Values" (BROWN et al., 2013)	-	-
57	Common Guidance for the Management & Monitoring of High Conservation Values" (BROWN, SENIOR, 2014)	-	-
58	Ecological survey report	-	14/03/2016
59	ARC A/R - Plantation records	-	-
60	Budget expenditures for ARC A/R project		
61	ARC Forestry projects experience details and track records	-	-
62	Project boundary maps	-	-
63	Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities	3.1	-
64	Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities	1.1	-
65	Intergovernmental Panel on Climate Change Good Practice Guidance for Land Use, Land-Use Change and Forestry (IPCC GPG LULUCF)	-	2003

APPENDIX 2: CLARIFICATION REQUESTS, CORRECTIVE ACTION REQUESTS, FORWARD ACTION REQUESTS (CAR/CL/FAR)

Table 1. CL from this Validation

CL ID	01	**Section no.**	2.1.1	**Date:** 09/02/2020
Description of CL				
Elaborate, by employing security guards how the governance of the project can be improved?				
Project participant response				**Date:** 16/03/2020
The statement has now been revised and required corrections has been made.				
Documentation provided by project participant				
PD				
DOE assessment				**Date:** 25/03/2020
The updated PD have been checked and found to be ok. CL01 is closed.				

CL ID	02	**Section no.**	2.5.10 and 2.5.15	**Date:** 09/02/2020
Description of CL				
The PP needs to explain that how double claiming of GHGs emission reductions or sequestration will be avoided and not claimed by two different entities. Refer section G5.9 of CCB standard ver.3.1 and 3.20.2 of VCS Standard ver. 4				
Project participant response				**Date:** 16/03/2020
Declaration letter for no double counting has been signed and submitted to the DOE.				
Documentation provided by project participant				
Declaration letter for no double counting				
DOE assessment				**Date:** 25/03/2020
The PP has submitted a declaration letter describing that no double counting is being claimed. The same is deemed acceptable. CL02 is closed.				

CL ID	03	**Section no.**	2.3.7	**Date:** 12/05/2020
Description of CL				
As per the PD the august 2017 workshop was held in the municipalities of Paragominas. However, the PD is not clear about whether the stakeholders from Ulianopolis and Nova de Esperanca, the other two municipalities of the project area where also invited in the same workshop or separate workshops were organized in the two municipalities.				
Project participant response				**Date:** 26/05/2020
The other two municipalities namely Ulianopolis and Nova de Esperanca participants were also present at the same venue has now been mentioned in the updated PD.				
Documentation provided by project participant				
PD				
DOE assessment				**Date:** 29/05/2020
The PD has now been updated and found to be ok. CL03 is closed.				

Table 1. CAR from this validation

CAR ID	01	**Section no.**	1	**Date:** 12/05/2020
Description of CAR				
1. Credits for reducing GHG emissions from avoided degradation is not consistent with the excel sheet. 2. Standardized benefits estimated against training, employment, livelihoods, health, education, well –being and biodiversity conservation categories is not consistent to the referred section.				
Project participant response				**Date:** 26/05/2020
1. In the revised PD, Credits for reducing GHG emissions from avoided degradation is now consistent with the excel sheet 2. Standardized benefits estimated against training, employment, livelihoods, health, education, well –being and biodiversity conservation categories is now consistent to the referred section in the revised PD.				
Documentation provided by project participant				
PD				
DOE assessment				**Date:** 29/05/2020
The revised PD and the excel sheet has been checked and found to be ok. CAR 01 is closed.				

CAR ID	02	**Section no.**	2.1.1	**Date:** 12/05/2020
Description of CAR				
Credits for reducing GHG emissions from avoided degradation is not consistent with the excel sheet.				
Project participant response				**Date:** 26/05/2020
In the revised PD, Credits for reducing GHG emissions from avoided degradation is now consistent with the excel sheet.				
Documentation provided by project participant				
PD				
DOE assessment				**Date:** 29/05/2020
The revised PD and the excel sheet has been checked and found to be ok. CAR 02 is closed.				

CAR ID	03	**Section no.**	2.1.5	**Date:** 12/05/2020
Description of CAR				
1. Add geodetic coordinates as required in section 2.1.5 of the CCB VCS Project Description template version 3. 2. Add vegetation type as required in section 2.1.5 of the CCB VCS project description template V.3 and section G1, point 7 of CCB Standard ver. 3.1.				
Project participant response				**Date:** 26/05/2020
1. Geocoordinates as required in section 2.1.5 of the PD has been updated 2. Vegetation type found in the project area has now been added in the updated PD.				
Documentation provided by project participant				
PD, KML files				
DOE assessment				**Date:** 29/05/2020

1. The Geo-coordinates in section 2.1.5 has seen to updated. The same looks fine.
2. The vegetation type found in the project area has now been added in the updated PD, the same is ok

CAR03 is closed.

CAR ID	04	**Section no.**	2.1.6	**Date:** 12/05/2020
Description of CAR				

• Maps to be removed and to be added in Section 2.1.7 and Section 2.1.9:
  • Project zone map (in Section 2.1.7)
  • Location of communities (identified in Section 2.1.9).				

Project participant response				**Date:** 26/05/2020
All types of maps as required under section 2.1.7 and 2.1.9, 4.1.3, has been updated in the PD				
Documentation provided by project participant				
PD				
DOE assessment				**Date:** 29/05/2020
All maps are seen to be updated in the revised PD, the same is ok. CAR04 is closed.				

CAR ID	05	**Section no.**	2.1.11	**Date:** 12/05/2020
Description of CAR				
As per section 2.1.11 description and requirement of VCS CCBA Project description template _CCB V.3.0_VCS V.3.3, The PP need a detailed description of the GHG emission reduction or removal activities, including: • For all measures listed, include information on any conservation, management or planting activities, including a description of how the various organizations, communities and other entities are involved. • In the description of the project activity, state if the project is located within a jurisdiction covered by a jurisdictional REDD+ program – mention if NA The same is not reflected in the section write-up				
Project participant response				**Date:** 26/05/2020
The PD has now been revised and the required additions has been made in Section 2.1.11 of the PD.				
Documentation provided by project participant				
PD				
DOE assessment				**Date:** 29/05/2020
The revised PD has been provided with the explanation about all measures listed, include information on any conservation, management or planting activities, including a description of how the various organizations, communities and other entities are involved. The PP has also included the statement stating that the project area is not located within a jurisdiction covered by a jurisdictional REDD+ program and found to be ok. CAR05 is closed.				

CAR ID	06	**Section no.**	2.1.12	**Date:** 12/05/2020
Description of CAR				

1. As per section 2.1.12 description and requirement of VCS CCBA Project description template V.3, The PP needs to describe that how the project contributes to achieving any nationally stated sustainable development priorities, including any provisions for monitoring and reporting same. 2. Add SDG Number against each identified SDG's.
Project participant response **Date:** 26/05/2020
1. The section 2.1.12 has now been revised and SDGs that the project contributes to achieve are listed. 2. SDG numbers are added in the revised PD.
Documentation provided by project participant
PD
DOE assessment **Date:** 29/05/2020
The details of the SDGs has been added in the updated PD and found to be ok. CAR06 is closed.

CAR ID	07	**Section no.**	2.1.15	**Date:** 12/05/2020
Description of CAR				
Crediting period date to be corrected				
Project participant response				**Date:** 26/05/2020
The crediting period date has now been corrected in the revised				
Documentation provided by project participant				
PD				
DOE assessment				**Date:** 29/05/2020
The details of the SDGs has been added in the updated PD and found to be ok. CAR07 is closed.				

CAR ID	08	**Section no.**	2.1.17	**Date:** 12/05/2020
Description of CAR				
The emission reduction and removals given is not consistent with the ER spreadsheet provided.				
Project participant response				**Date:** 26/05/2020
The crediting period date has now been corrected in the revised				
Documentation provided by project participant				
PD and ER Excel sheet				
DOE assessment				**Date:** 29/05/2020
In the revised PD the emission reduction and removals is consistent with the ER excel sheet and found to be ok. CAR08 is closed.				

CAR ID	09	**Section no.**	2.2.3	**Date:** 12/05/2020
Description of CAR				
Only pasture or where there was agriculture activities as well as one of the main land use practice in the baseline scenario? Maintain consistencies in providing information baseline scenario mentioned in each of the relevant sections of the PD.				

Project participant response	**Date:** 26/05/2020
The PD has now been updated and the baseline scenario description is now consistent across the PD.	
Documentation provided by project participant	
PD	
DOE assessment	**Date:** 29/05/2020
The baseline scenario description is consistent across the revised version of the PD and found to be ok. CAR09 is closed.	

CAR ID	10	**Section no.**	2.4	**Date:** 12/05/2020
Description of CAR				
As per section G4.1, CCB Standard ver. 3.1, PP needs to describe the project's governance structures and roles and responsibilities of all the entities involved in project design and implementation. Add the management governance structure as per the requirement.				
Project participant response				**Date:** 26/05/2020
The management structure has now been explained and a flow chart is added in the updated PD.				
Documentation provided by project participant				
PD				
DOE assessment				**Date:** 29/05/2020
The description provided in the updated PD has been found to be elaborated on the governance structures, roles and responsbilites of all the entities involved. The agreements between the PP and the land owner have been checked and found to be ok. CAR10 is closed.				

CAR ID	11	**Section no.**	2.4.1	**Date:** 12/05/2020
Description of CAR				
As per section G5.7, CCB Standard ver. 3.1, PP needs to provide published government reference to prove that the fact that in Brazil there are not regulations regarding Afforestation or REDD projects and the fact that the Project will not undertake extractive activities but will preserve 100% of its Project Area, permits are not required from municipal, state or federal authorities.				
Project participant response				**Date:** 26/05/2020
References to prove that permits are not required from municipal, state or federal authorities for the proposed project is added in the updated PD.				
Documentation provided by project participant				
PD				
DOE assessment				**Date:** 29/05/2020
The references has been added in the updated PD and found to be ok. CAR11 is closed.				

CAR ID	12	**Section no.**	3.1.1	**Date:** 12/05/2020
Description of CAR				
Provide version number of the tools applied for developing the project as required in section 3.1.1 of the CCB VCS Project Description template CCB V3, VCS V.3.3.				

Project participant response	**Date:** 26/05/2020
Version number of all the tools referred to develop the PD has now been mentioned in the updated PD	
Documentation provided by project participant	
PD and tools used	
DOE assessment	**Date:** 29/05/2020
The tools used have been found to be ok. CAR 12 is closed.	

CAR ID	13	**Section no.**	3.1.2	**Date:** 28/05/2020
Description of CAR				
The PP is required to provide justification that how the project complies with the applicability conditions of all the tools referred in the methodology as per point number 4, Section 2.2 of the applied methodology AR-ACM0003 V.2.				
Project participant response				**Date:** 30/05/2020
The justification that how the project complies with the applicability conditions of all the tools referred in the methodology has now been added in section 3.1.2 of the updated PD				
Documentation provided by project participant				
PD and tools used				
DOE assessment				**Date:** 02/06/2020
The justification of applicability condition for all the tools used to develop the PD has been included and found to be ok. CAR 13 is closed.				

CAR ID	14	**Section no.**	3.1.3	**Date:** 12/05/2020
Description of CAR				
1. The table mentioned is neither a carbon pool table nor a GHG sources table. Refer the applied methodology and provide both the tables of carbon pools and GHG sources as mentioned in the applied methodology section 5.1 Selection of carbon pools and greenhouse gases accounted. 2. It is compulsory to mention this emission source in the table under this applied methodology. Hence, PP needs to revise the statement. However, in the project emission calculation, PP may say that no such activities were undertaken and hence the calculated emission is zero.				
Project participant response				**Date:** 28/05/2020
1. The table is now deleted and revised table of carbon pool and GHG emission sources as given in the applied methodology is now added in the revised PD. 2. The justification is now been revised in the PD				
Documentation provided by project participant				
PD and applied methodology				
DOE assessment				**Date:** 29/05/2020
The revised tables found to be ok. CAR 14 is closed.				

CAR ID	15	**Section no.**	3.1.5	**Date:** 12/05/2020
Description of CAR				

1. What are the evidences submitted to prove that the starting date of the A/R CDM project activity was after 31 December 1999 and that the incentive from the planned sale of VCUs was seriously considered in the decision to proceed with the project activity?
2. What were the methods used by the PP for identifying land use scenario 1. The same is missing in the justification provided. Refer points 10 and 11 of the "Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities" V.01
3. Provide scientific name Southern Blue Gum and Chir Pine
4. From the write-up it is not at all clear that the project will lead to an increased rate of afforestation/reforestation that would not occur in the absence of the project activity and that this results from direct intervention by the project participants. If the proposed A/R CDM project activity does not increase the rate of afforestation/reforestation, the proposed project activity is not additional. Refer bullet 2 and 3 of point 9 of the applied tool of Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities v.1
5. Provide all the possible evidences that are listed under point 17 of the applied tool Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities v.1. In the justification mentioned very few and not so robust evidences are provided as required in the point 17 of the applied tool.
6. The PP has listed 3 barriers above and mentioned only 2 barriers in the outcome of sub-step 2a that may prevent one or more land use scenarios identified in the Step 1b. Make the required corrections in either of the statements.

Project participant response	**Date:** 28/05/2020

1. Evidence is the government land registration documents and ARC expenditure sheets has now been provided in the revised PD.
2. Methods used by the PP for identifying land use scenario 1 has now been added in the revised PD
3. The scientific name of Southern Blue Gum (Eucalyptus globulus), Chir Pine (Pinus roxburghii) has now been added in the updated PD
4. Justification to prove that the project will lead to an increased rate of afforestation/reforestation that would not occur in the absence of the project activity has now been added in the land use Scenario 2 description of the PD in section 3.1.5
5. All the possible evidences that are listed under point 17 of the applied tool Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities v.1 has now been added in the revised PD
6. The required correction has now been made in the revised PD and three barriers that may prevent one or more land use scenarios identified in the Step 1b is listed

Documentation provided by project participant
PD and Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities v01

DOE assessment	**Date:** 29/05/2020
The revised details provided by PP in the revised PD are found to be ok. CAR 15 is closed.	

CAR ID	16	**Section no.**	3.2.1	**Date:** 12/05/2020
Description of CAR				
The estimated emission is baseline is concluded zero. However, in the spreadsheet calculation of baseline, the baseline calculation (check column S) is not zero and make correction either in the document.				

Project participant response	**Date:** 28/05/2020
The correction has now been made in the ER excel sheet	
Documentation provided by project participant	
ER excel sheet	
DOE assessment	**Date:** 29/05/2020
The revised calculation provided in the revised ER excel sheet are found to be ok. CAR 16 is closed.	

CAR ID	17	**Section no.**	3.2.4	**Date:** 28/05/2020

Description of CAR

1. The various steps to estimate GHG removal is not included and shall be included by following AR-TOOL 14 step by step. This includes ex-post method of calculations, equations for determining biomass, monitoring methods, sampling method, uncertainty calculations, applying uncertainty discount, etc. as per the tool.
2. The method for estimating change in carbon stock in trees between two points of time is not included.
3. This equation given is for ex-ante calculations. The ex-post method of calculations is not included.
4. Cross check the value with the assumption excel sheet and make correction of the following:
   - Annual Increment in volume of wood, (Iv)
   - Wood density, (D)
   - Biomass Expansion Factor, (BEF)
   - Root-shoot-ratio, (R)
5. Represent the parameters correctly across the Section
6. Refer the correct table number of IPCC GPG for LULUCF. Make similar corrections across the section.
7. Allometric equation for Mean tree biomass estimation and litter estimation is missing.
8. The values mentioned of the total GHG benefit, calculated as the sum of stock changes along the 30-year period is not consistent with the ER excel sheet provided.
9. Provide relevant literature to substantiate the values considered for the parameters to calculate SOC
10. Section 3.1.3 Project boundary mentions that dead wood and litter will not be considered. Here there is an explanation of calculations. Not consistent.
11. In section 3.1.3, selected carbon pools accounts only for above-ground, below-ground carbon and soil organic carbon pools, but not shrub biomass, dead wood and litter. Kindly clarify as all these parameters are included in the equation.
12. The table has a value of 0.51 for E.robusta and 0.64 for Eucalyptus citriodora and 0.34 for Eucalyptus deglupta. How is 0.65 considered for E.urophylla?

Project participant response	**Date:** 30/05/2020

1. All the steps as per AR-TOOL 14 has now been included in the revised PD
2. The method for estimating change in carbon stock in trees between two points of time is now been included in the revised PD
3. The ex-post tree biomass estimation is now been included in the revised PD
4. The values for Annual Increment in volume of wood,, Wood density, Biomass Expansion Factor and Root-shoot-ratio has now been revised in the PD
5. The parameters representation has now been revised and is consistent with the methodology, tools and guidelines used.
6. The IPCC GPG LULC table number has now been corrected across the section 3.2.4 in the revised PD
7. Allometric equation of MTB and Litter estimation has now been added in the revised PD
8. The values of GHG benefits for each year has now been corrected in the revised PD
9. The literature to substantiate the values considered for the parameters to calculate SOC has now been added in the revised PD
10. The correction has now been made in the revised PD
11. The corrections has now been made in the revised PD
12. The correct value has now been mentioned in the revised PD

Documentation provided by project participant

PD, IPCC GPG LULUCF 2003, AR-ACM0003 v2, AR-TOOL 12 v3.1, Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities v1.1, ER excel sheet

DOE assessment | **Date:** 02/06/2020

Section 3.2.4 has been checked and found that the parameters, default values considered, table referred for default values, allometric equation and values of GHG benefits are correct and as per the applied tools/methodology/guidelines. CAR 17 is closed.

CAR ID	18	**Section no.**	3.3.1 and 3.3.2	**Date:** 12/05/2020

Description of CAR

1. Cross check the value with the assumption excel sheet and make correction of the following:
   - Annual Increment in volume of wood, (Iv)
   - Wood density, (D)
   - Biomass Expansion Factor, (BEF)
   - Root-shoot-ratio, (R)
2. Refer the correct table number of IPCC GPG for LULUCF. Make similar corrections across the section.
3. Project area value to be corrected
4. How is shrub included, if not being monitored and included for GHG removal calculations?
5. Where is the conversion method from wet to dry biomass which is mentioned in the description of the BEF?
6. Why is dead wood considered, if the carbon pool is not considered for C calculations?
7. Why is litter considered, if the carbon pool is not considered for C calculations?
8. The method for sampling is not provided for Ap.i parameter.
9. The method for sampling is not provided for n parameter.
10. The method for sampling is not provided for ni parameter.

Project participant response | **Date:** 28/05/2020

1. The values for Annual Increment in volume of wood,, Wood density, Biomass Expansion Factor and Root-shoot-ratio has now been revised in the PD
2. The IPCC GPG LULC table number has now been corrected across the section 3.2.4 in the revised PD
3. The values of GHG benefits for each year has now been corrected in the revised PD
4. The correction has now been made in the revised PD
5. This correction has now been made in the revised PD
6. The correction has now been made in the revised PD
7. The correction has now been made in the revised PD
8. The sampling method has now been included in the description of measurement methods and procedures to be applied row.
9. The sampling method has now been included in the description of measurement methods and procedures to be applied row.
10. The sampling method has now been included in the description of measurement methods and procedures to be applied row.

Documentation provided by project participant

PD, IPCC GPG LULUCF 2003 and ER excel sheet

DOE assessment | **Date:** 29/05/2020

Sections 3.3.1 and 3.3.2 has been checked and found that the parameters, default values considered and table referred for default values are correct and as per the applied tools/methodology/guidelines. CAR 18 is closed.

CAR ID	19	**Section no.**	3.3.4	**Date:** 12/05/2020

Description of CAR

Revise the complete section as per the requirements of section 3.3.4 of the VCS CCB template v.3.3. Describe how the monitoring plan, and any results of monitoring undertaken in accordance with the monitoring plan, will be disseminated and made publicly available on the internet. Describe the means by which summaries (at minimum) of the monitoring plan and results will be communicated to the communities and other stakeholders.

Project participant response | **Date:** 28/05/2020

In the PD, the section has now been revised completely as per the requirements of section 3.3.4 of the VCS CCB template v.3.3

Documentation provided by project participant

PD

DOE assessment | **Date:** 29/05/2020

Section 3.3.4 has been checked and found that the description is as per the requirement and found ok. CAR 19 is closed.

CAR ID	20	**Section no.**	4.1.2	**Date:** 12/05/2020

Description of CAR

1. The PP needs to provide detailed description about interactions at the start of the project between the communities and community groups required in section 4.1.2 of the CCB VCS Project description template V. 3.
2. As per section 4.2.1 the information to be added are whether each impact is predicted or actual, direct or indirect, and whether it is a benefits, a cost or risk. Hence, revise the write-up.

Project participant response	**Date:** 25/05/2020
1. Detailed description of the interactions with the community, land owners and other stakeholders is clearly mentioned in the PD and the document proof is also submitted to the validating DOE. 2. Direct and Indirect impact on the community is added in the PD and the same is submitted to DOE.	
Documentation provided by project participant	
PD, photographs, summary of trainings conducted and attendance sheets	
DOE assessment	**Date:** 28/05/2020
1. The stakeholders meetings, interactions with the landowners have been checked and found to be ok. 2. The direct and the indirect impact on the community with the relevant to the project implementation has been checked and found to be ok. CAR 20 is closed.	

CAR ID	21	**Section no.**	4.1.3	**Date:** 12/05/2020
Description of CAR				
Re-write the section and revise it as required in section CM1.2 of the CCB Standard v3.1 and section 4.1.3 of the CCB VCS Project description template V. 3. PP have to evaluate whether the project zone includes any of high conservation values (HCVs) related to community well-being and describe the qualifying attributes for any identified HCVs.				
Project participant response				**Date:** 25/05/2020
Section 4.1.3 has been revised and HCVs related to community well-being and their qualifying attributes has now been added in the PD.				
Documentation provided by project participant				
PD and Project Resource management plan				
DOE assessment				**Date:** 28/05/2020
PP has added description and details of HCVs as per the standard and template requirements and found to be OK. CAR 21 is closed.				

CAR ID	22	**Section no.**	4.2.1	**Date:** 12/05/2020
Description of CAR				
Re-write the section and revise it as required in section CM2.1 of the CCB Standard v3.1 and section 4.1.3 of the CCB VCS Project description template V. 3. PP have describe measures needed and taken to mitigate any negative well-being impacts on community groups and for maintenance or enhancement of the HCVs attributes (identified in CM1.2) consistent with the precautionary principle.				
Project participant response				**Date:** 25/05/2020
Section 4.2.1 has been revised and measures needed and taken to mitigate any negative well-being impacts on community groups and for maintenance or enhancement of the HCVs attribute has now been added in the PD.				
Documentation provided by project participant				
PD and Project Resource management plan				
DOE assessment				**Date:** 28/05/2020

PP has added description as per the standard and template requirements and found to be OK. CAR 22 is closed.

CAR ID	23	**Section no.**	4.3.1	**Date:** 12/05/2020
Description of CAR				
Identify and mention if any such impacts is happening due to project activities as required in section CM3.1 of CCB standard v.3.1 and section 4.3.1 of the CCB VCS Project description template CCB V3 and VCS V3				
Project participant response				**Date:** 25/05/2020
Section 4.3.1 has been revised as per the requirements in the PD.				
Documentation provided by project participant				
PD and Project Resource management plan				
DOE assessment				**Date:** 28/05/2020
PP has added description as per the standard and template requirements and found to be OK. CAR 23 is closed.				

CAR ID	24	**Section no.**	3.1.1	**Date:** 12/05/2020
Description of CAR				
Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities is missing.				
Project participant response				**Date:** 25/05/2020
Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities has now been added in the revised PD.				
Documentation provided by project participant				
PD				
DOE assessment				**Date:** 28/05/2020
PP has made the required correction and found to be OK. CAR 24 is closed.				

CAR ID	25	**Section no.**	NA	**Date:** 12/05/2020 / 16/05/2020
Description of CAR				
1. Default values considered for baseline and project calculation has not been linked with the assumption sheet 2. Calculation of baseline found to be incorrect and to be revised.				
Project participant response				**Date:** 25/05/2020 / 28/05/2020
Default values considered for baseline and project calculation has now been linked with the assumption sheet and corrections in the baseline calculation made in the revised ER excel sheet				
Documentation provided by project participant				
ER excel sheet				
DOE assessment				**Date:** 28/05/2020 / 30/05/2020
PP has made the required correction in the ER excel sheet and found to be OK. CAR 25 is closed.				

CAR ID	26	**Section no.**	3.3.3	**Date:** 12/05/2020
Description of CAR				
Which tool/method was applied to estimate uncertainty? Also, mention the formula applied to calculate the same.				
Project participant response				**Date:** 28/05/2020
The method as per AR-TOOL 14 has now been added in the revised PD.				
Documentation provided by project participant				
PD				
DOE assessment				**Date:** 29/05/2020
Section 3.3.3 has been checked and found that the description is as per the requirement and found ok. CAR 19 is closed.				

APPENDIX 3: COMPETENCE OF TEAM MEMBERS

Certificate of Competence							
Name	☒ Mr. ☐ Ms.	**Ma Paa Puratchikkanal**					
Qualification Procedure		*Fulfils the requirement as per the appointment of personnel procedure of 4KES for Validation and Verification of CDM/VCS/GS/GHG Projects.*					
Appointed to work as:							
		CDM Validator/Verifier	**Team Leader**	**Team Member**	**Technical Expert**	**Technical Reviewer**	**Financial Expert**
Appointed		Yes	Yes	Yes	Yes	Yes	No
Appointed Date		29-07-2019					
Authorized to work as Technical Expert for:							
Authorized Technical Area		**Sectoral Scope**		**TA Code**	**Technical Area within the scope**		
		Energy industries (renewable - / non-renewable sources)		1.1	Thermal energy generation		
		Energy industries (renewable - / non-renewable sources)		1.2	Renewables		
		Energy demand		3.1	Energy demand		
		Construction		6.1	Construction		
		Waste handling and disposal		13.1	Solid waste and wastewater		
		Agriculture		15.1	Agriculture		
Authorized to work as Local Expert for:							
Country/Countries		India					
Compliance check by: Anand S. R.							

Certificate of Competence							
Name	☒ Mr. ☐ Ms.	**Ewerton Alves Nazareno**					
Qualification Procedure		*Fulfils the requirement as per the appointment of personnel procedure of 4KES for Validation and Verification of CDM/VCS/GS/GHG Projects.*					
Appointed to work as:							
		CDM Validator/Verifier	**Team Leader**	**Team Member**	**Technical Expert**	**Technical Reviewer**	**Financial Expert**

Appointed	No	No	Yes	Yes	No	No
Appointed Date	01-08-2019					
Authorized to work as Technical Expert for:						
Authorized Technical Area	Waste handling and disposal		13.1	Solid waste and wastewater		
	Afforestation and reforestation		14.1	Afforestation and reforestation		
Authorized to work as Local Expert for:						
Country/Countries	Brazil, Columbia					
Compliance check by: Anand S.R.						

Certificate of Competence

Name	☐ Mr. ☒ Ms.	**Zainab Hassan**				
Qualification Procedure	*Fulfils the requirement as per the appointment of personnel procedure of 4KES for Validation and Verification of CDM/VCS/GS/GHG Projects.*					
Appointed to work as:						
	CDM Validator/Verifier	**Team Leader**	**Team Member**	**Technical Expert**	**Technical Reviewer**	**Financial Expert**
Appointed	No	No	Yes	Yes	No	No
Appointed Date	29-07-2019					
Authorized to work as Technical Expert for:						
Authorized Technical Area	Afforestation and reforestation		14.1	Afforestation and reforestation		
Authorized to work as Local Expert for:						
Country/Countries	India					
Compliance check by: Anand S.R.						

Certificate of Competence

Name	☒ Mr. ☐ Ms.	**Narendra Kumar .R**
Qualification Procedure		*Fulfils the requirement as per the appointment of personnel procedure of 4KES for Validation and Verification of CDM/VCS/GS/GHG Projects.*

Appointed to work as:

	CDM Validator/Verifier	**Team Leader**	**Team Member**	**Technical Expert**	**Technical Reviewer**	**Financial Expert**
Appointed	Yes	Yes	Yes	Yes	Yes	No
Appointed Date	29-07-2019					

Authorized to work as Technical Expert for:

	Sectoral Scope	**TA Code**	**Technical Area within the scope**
Authorized Technical Area	Energy industries (renewable - / non-renewable sources)	1.1	Thermal energy generation
	Energy industries (renewable - / non-renewable sources)	1.2	Renewables
	Energy demand	3.1	Energy demand
	Waste handling and disposal	13.1	Solid waste and wastewater

Authorized to work as Local Expert for:

Country/Countries	India

Compliance check by: Anand S. R.

Certificate of Competence

Name	☐ Mr. ☒ Ms.	**Sudha Padmanabha**
Qualification Procedure		*Fulfils the requirement as per the appointment of personnel procedure of 4KES for Validation and Verification of CDM/VCS/GS/GHG Projects.*

Appointed to work as:

	CDM Validator/Verifier	**Team Leader**	**Team Member**	**Technical Expert**	**Technical Reviewer**	**Financial Expert**

Appointed	No	No	No	Yes	No	No
Appointed Date	01-08-2019					
Authorized to work as Technical Expert for:						
Authorized Technical Area	Afforestation and reforestation		14.1	Afforestation and reforestation		
Authorized to work as Local Expert for:						
Country/Countries	India					
Compliance check by: Anand S.R.						

APPENDIX 4: ABBREVIATIONS

4KES	4K Earth Science Private Limited
AFOLU	Agriculture, Forestry and Other Land Use
APU	Annual Productive Unit
ARC	Amazon Reforestation Consortium
ARR	Afforestation, reforestation and revegetation
AUD	Avoided Unplanned Deforestation
CAR	Corrective Action Request
CCB	Climate, Community & Biodiversity
CCBA	Climate, Community & Biodiversity Alliance
CDM	Clean Development Mechanism
CL	Clarification Request
DCH	Diameter at the Chest Height
EB	Executive Board
ER	Emission Reductions
FAR	Forward Action Request
FAO	Food and Agricultural Organization of United States
FSC	Forest Stewardship Council
GHG	Greenhouse Gases
ICDP	Integrated conservation and development projects
HDI/IDH	Human Development Index
HCV	High Conservation Values

IFM	Improved forest management
INCRA	Instituto Nacional de Colonização e Reforma Agrária (from the Portuguese National Institue of Colonisation and Land Reform)
INPE	National Institute of Space Research (from the Portuguese Instituto Nacional de Pesquisas Espaciais)
IPCC	Intergovernmental Panel for Climate Change
LK	Leakage belt
LMA	Leakage Management Area
MoU	Memorandum of Understanding
MP	Monitoring Period
MRV	Monitoring, Reporting and Verification
NTFPs	Non-Timber Forest Products
PD	Project Description
PES	Payments for ecosystem services
PP	Project proponent
PRA	Participatory Rural Appraisal
PRODES	Forestry Satellite Monitoring Project
QA/QC	Quality Assurance/Quality Control
REDD	Reduced Emissions from Deforestation and Degradation
RRD	Reference region for rate of deforestation
RRL	Reference Region for Location (RRL)
SBIA	Social Impact and the Biodiversity
SFMP	Sustainable Forest Management Plan
tCO_2	Tonnes of Carbon Dioxide
UNFCCC	United Nations Framework Convention on Climate Change
UPA	Annual Production Unit (from the Portuguese Unidade de Produção Annual)
VCS	Verified Carbon Standard
VCSA	Verified Carbon Standard Association
VCU	Verified Carbon Unit