



**Verified Carbon
Standard**

VALIDATION REPORT
RWANDA RIPARIAN RESTORATION
PROJECT



Document prepared by TÜV NORD CERT GmbH

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Report Title	Validation Report Rwanda Riparian Restoration Project
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Summary:

Description of validation and project: The “Rwanda Riparian Restoration Project” is a revegetation project located in Rwanda. The proposed project activity is carried out by “EcoPlanet Bamboo, Eastern Africa” and is designed as a grouped project. It contains as a first instance the revegetation of about 1000 ha of degraded riparian buffer zones in the Western and Southern Province with different species of clumping woody bamboo with the specific purpose of increasing the carbon stock and associated GHG emission removals. The finance of the project is done by carbon offsets only. No commercial harvesting is planned and hence, no financial returns are associated with the project activity. The land, where the planting is done, is under the responsibility of the governmental authority “Rwanda Water Board” RWB. The bamboo is supposed to provide protection of the watercourses, especially against erosion. Small existing patches of remaining forests, solitary trees and native vegetation are left untouched, and bamboo is interplanted only on areas that are proven non forest for at least 10 years prior to project start. In further instances the continuation of these activities is planned on other rivers, streams and lakes. A pilot project was successfully implemented in 2019 – 2021. The proposed project activity has started with planting activities in late 2022 with the beginning of the rainy season. Planting will continue for 2 years. The project is designed as a group project. The initial project activity represents an initial total potential GHG emission removal of 1,039,272 tCO₂e resulting in an average annual GHG emission removal of 51,964 tCO₂e over the 20 year project crediting period.

Purpose and scope: The validation objective is an independent assessment by a Third Party of a proposed project activity against all defined criteria set for the registration under the under VCS, Scope 14 “Agriculture, Forestry, and other Land Use (AFOLU).

In order to confirm that the project activity, as documented, is sound, reasonable and meets the identified criteria, the validation involves the assessment of project conformance to VCS rules, project conformance to the applied methodology, including the procedure for the demonstration of additionality specified in the methodology; and likelihood that methods and procedures set out in the project description will generate verifiable GHG data and information when implemented. Validation is a requirement and is seen as necessary to provide assurance to stakeholders of the quality of project and its intended generation of VCUs. Validation is part of the VCS project cycle and will finally result in a conclusion by the executing VVB whether a project activity is valid to be submitted for registration to VCS registry. The ultimate decision on the registration of a proposed project activity rests with the VCS/Verra.

Method and criteria: The Validation is conducted using TÜV NORD CERT GmbH procedures in line with the requirements specified in the latest version of the VCS Validation and Verification Manual and applying standard auditing techniques. The validation team assessed the proposed project activity’s compliance under the VCS Version 4.3 VCS Program Guide Version 4.1, AFOLU Non-Permanence Risk Tool Version 4.1, Methodology AR-ACM0003 version 02.0 – “Afforestation and reforestation of lands except wetlands”. The members of the audit team carry out the desk review based on the initial PD, follow-up actions, onsite visit, resolution of issues identified and finally preparation of the validation report. The prepared validation report and other supporting documents then undergo an internal quality control by the Certification Body “TÜV NORD CERT GmbH”, before final submission of the validation report.

Number of findings: In the course of the VCS Verification, 9 Clarification request (CL) and 2 Correction Action Requests (CAR) were raised and successfully closed. 2 Forward Action Requests (FAR) have been raised.

Uncertainties: There are no restrictions of uncertainty.

Summary of the validation conclusion EcoPlanet Bamboo Group has commissioned the TÜV NORD JI/CDM Certification Program as Third-Party a to carry out an independent assessment (Validation) of the “Rwanda Riparian Restoration Project” against the requirements of VCS Version 4.3.

The review of the project documentation, the observations made during the onsite visit and the subsequent follow-up interviews have provided TÜV NORD with sufficient evidence to determine the fulfilment of all stated criteria. In our opinion, the “Rwanda Riparian Restoration Project” has demonstrated positive conformance to the VCS Version 4.3. The GHG assertion provided by the EcoPlanet Bamboo Group and validated by TÜV NORD will result in the expected GHG emission removal of 1,039,272 tCO₂e on 400,000 bamboo clumps over the 20 years crediting period.

Note:

Template for this Validation Report is “VCS-Validation-Report-Template-v4.1” as downloaded from VCS website. <https://verra.org/programs/verified-carbon-standard/vcs-program-details/#rules-and-requirements>

The downloaded Template shows in the header “Validation Report: VCS Version 4.0”. Hence, the VVB changed the header to “4.1 to reflect the current version of the template correctly.

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1 INTRODUCTION

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1.1 Objective

The purpose of the validation audit was to conduct an independent assessment of the project in order to determine whether the project complies with the validation criteria, as set out in the guidance documents listed in Section 1.2 of this report.

EcoPlanet Bamboo Group, LLC has commissioned the TÜV NORD JI/CDM Certification Program to carry out the Validation of the project “Rwanda Riparian Restoration Project”

The objectives of this audit included a validation of the projects calculated emission reductions with the Verified Carbon Standard requirements and any additional requirements of VCS AFOLU projects, besides the assessment of the baseline, the additionality and the risk assessment report.

1.2 Scope and Criteria

Validation Scope: The scope of the validation is to validate the emissions reductions of the proposed project activity in Ghana against the Verified Carbon Standard, the identified methodology and associated tools, for the crediting period from 01/10/2022 to 30/09/2042. The validation is based on the project design document^{/01/}, the Non-Permanence Risk Report, ^{/02/}, supporting documents made available and information collected through performing interviews and during the on-site assessment. Furthermore, publicly available information was considered as far as available and required.

Validation Criteria: In accordance with Section 4.1.8 of the VCS Standard, the criterion for validation was the VCS Version 4, including the following documents:

- VCS Standard v4.3
- VCS Program Guide v4.1
- VCS AFOLU Non-Permanence Risk Tool2v 4.0
- AR-ACM0003: Afforestation and reforestation of lands except wetlands”, Version 02.0

Unless otherwise indicated, the assessment was performed against the most recent version of the relevant VCS documents.

1.3 Level of Assurance

The validation has been planned and organized to achieve a

- reasonable level of assurance
- limited level of assurance

of conformance against the defined audit criteria and materiality thresholds within the audit scope. Based on the audit findings, a positive evaluation statement reasonably assures that the project GHG assertions are materially correct and is a fair representation of the GHG data and information.

1.4 Summary Description of the Project

The project proponent, EcoPlanet Bamboo Group, LLC (“EcoPlanet”) is one of the leading companies in the development of bamboo plantations. It has about 10 years of experience in research, cultivation and plantation establishment of bamboo.

The “Rwanda Riparian Restoration Project” aims to revegetate riverine vegetation on rivers, streams and lakes in Rwanda with different species of giant bamboo, *Bambusa textilis* and *Bambusa polymorpha*. The buffer zones alongside these watercourses are under the administration of the Rwanda Water Board according to Rwandan Law. The land is owned by the state^{/08//22/}. EcoPlanet has an agreement with the RWB to plant the bamboo and to utilize the carbon for financing the project^{/05/06/}. The aim of the project is the protection of erosion alongside the watercourses by the planting of Bamboo. The first instance covers the restoration of 500 ha alongside rivers in the districts of Karingi, Muhanga, Ngororero and Ruhanga in 2022 and an additional 500 ha in 2023 in districts still to be determined. The project is a pure conservation project with no planned commercial use. The total number of clumps to be planted is 400,000 with a spacing of five by five metres. This will result in a calculated area of 1000 ha of bamboo plantation. The planting will be executed on those areas on the riverbanks that have been deforested at least 10 years ago. Relict patterns of existing forest, areas that have been deforested less than 10 years ago, solitary trees and other types of existing woody vegetation will be left untouched. The bamboo will be interplanted with the target to protect the river without damaging the existing native tree vegetation.

Seedlings are raised in the nurseries on site and transported to the planting sites with the onset of the rains each year. Land preparation and all associated management activities are carried out manually.

See CL 01

2 VALIDATION PROCESS

2.1 Method and Criteria

The validation was performed through a combination of desk review of initially provided documents, an onsite visit to the Project owners local head office including detailed document check, field inspections of the project area and plating sites and interviews with relevant personnel and stakeholders. At all times, the project was assessed for conformance to the criteria described in Section 1.2 of this report. As discussed in Section 2.5, findings were issued to ensure that the project was in full conformance to all requirements.

The validation of the project consisted of the following steps:

- Contract review
- Appointment of team members and technical reviewers
- Publication of the VCS project description
- A desk review of the VCS project description submitted by the client and additional supporting documents with the use of customised validation protocol
- Validation planning
- On-Site assessment
- Background investigation and follow-up interviews with personnel of the project developer and its contractors
- Draft validation and verification reporting
- Resolution of corrective actions
- Final validation and verification reporting
- Technical review
- Final approval of the validation and verification.

The sequence of the validation is given in the table 2.2 below:

▪ **Table 2.1:** Validation/Verification sequence

Topic	Date
Assignment of validation	13/12/2021
Onsite-Audit, field visits and Interviews	26/07/2022 till 28/07/2022
Draft reporting finalized	10/10/2022
Final reporting finalized	15/12/2022
Final reporting after accuracy review, round 1	15/09/2023
Final reporting after accuracy review, round 2	

Appointment of team members and technical reviewer

Based on a competence analysis and individual availabilities, a verification team was appointed. Furthermore, also the personnel for the technical review and the final approval were determined.

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The list of involved personnel, the tasks assigned, and the qualification status are summarized in the table 2.2 below.

Table 2.2: Involved Personnel

	Name	Company	Function ¹⁾	Qualification Status ²⁾	Scheme Competence ³⁾	Technical Competence ⁴⁾	Verification Competence ⁵⁾	Host country Competence	Remote audit
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Martin Seitz	ETE	TL ^{A)}	LA	<input checked="" type="checkbox"/>	14.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-
<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms.	Alexandra Nuske	TN CERT	FA/ TR ^{B)}	SA	<input checked="" type="checkbox"/>	14.1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	-

¹⁾ TL: Team Leader; TM: Team Member^{A)}, TR: Technical review^{B)}; OT: Observer-Team^{B)}, OR: Observer-TR^{B)}; FA: Final approval^{B)}

^{A)} Team Member: GHG auditor (at least Assessor status), Technical Expert (incl. Host Country Expert or Verification Expert), not ETE

^{B)} No team member: OT, TR, OR, FA

²⁾ GHG Auditor Status: A: Assessor; LA: Lead Assessor; SA: Senior Assessor; T: Trainee; TE: Technical Expert

³⁾ GHG auditor status (at least Assessor)

⁴⁾ Technical Area / TR Subcategory as per S01-VA000-F02 or S01-VA070-F01 (such as 1.1, 1.2, ...)

⁵⁾ In case of verification projects

2.2 Document Review

The Project Description Document submitted by the Project Proponent (PP) was reviewed against the approved methodology and against VCS requirements. Additional background documents related to the project design, baseline and additionality were also made available before and during the audit, along with the non-permanence risk report.

Furthermore, the validation team used additional documentation by third parties like host party legislation, technical reports referring to the project design or to the basic conditions and technical data.

The references used in the course of this validation are summarized in Appendix 2.

The validation was performed based on the document check and site inspection. Refer to section 3 of this report for the validation process in detail and corresponding documents review.

To address the corrective actions and clarification requests that arose from the audit, the PP revised the project description document version 1 and developed a final version 1.4, dated.

2.3 Interviews

The validation/verification team has carried out interviews to assess the information included in the project documentation and to gain additional information regarding the compliance of the project with the relevant criteria applicable for the VCS.

Representatives of the PP, governmental authorities of different levels, consultants, service providers and other parties including the operational staff and workers of the plantation and members of a community adjacent to the plantation area have been interviewed.

The interviews served to confirm selected information and to resolve issues identified in the document review. The main topics of the interviews are summarized in Table 2-3, a list of main interviewed persons can be found in Appendix IV. A full set of the attendance register including all names and signatures is available ^{/10/} but not included due to privacy concerns.

Table 2.3: Interviewed groups of persons and interview topics

Interviewed Persons / Entities	Interview topics
Project proponent representatives	- Chronological description of the project activity with documents of key steps of the implementation.
Governmental authorities	- Technical details of the project realization, project feasibility, designing, operational lifetime, monitoring of the project
Service providers	- Financial aspects
Employees and workers	- Crediting period
Community members	- Project activity starting date
	- Ownership, Title deed,
	- Baseline study assumptions
	- Additionality
	- Monitoring
	- Analysis of local stakeholder consultation
	- Roles & responsibilities of the project participants w.r.t. project management, monitoring and reporting
	- Editorial issues of the VCS PD
	- Environmental aspects
	- Social-economic aspects

2.4 Site Inspections

As most essential part of the validation/verification exercise, it is indispensable to carry out an inspection on site in order to verify that the project design is in accordance with the applicable standard criteria.

Between 26 July and 28 July 2022, TÜV North performed a physical site inspection to confirm relevant information and to resolve issues identified in the first document review. The audit team documented the results from the onsite visit in respective field data notes^{/09/}.

The auditor visited the project area and randomly selected a variety of samples for verification of the description provided in in the PD, the Non-Permanence Risk Report, the forest cover map, the shape files and other supporting documentation. The governmental authority Rwanda Water Resource Board provided the shapfiles for the potential rivers. It became obvious that there is nearly no natural vegetation left as the population pressure in the area is high. Natural forests have been cut already long time ago. There are only eucalyptus plantations, but usually not in the vicinity of the rivers.

Next to the planting sites from the pilot project, potential planting sites for 2022 and the nursery have been visited. In addition, a village community meeting with the nearby village was held and interviews with workers, opinion leaders and community members^{/09/10/21/} were conducted.

In addition, the audit team visited the following state authorities for interviews:

- Headquarter of Rwanda Water Resource Board, Kigali
- Field Staff of Rwanda Water Resource Board,

The main tasks covered during the site visit include, but are not limited to:

- the verification of the project boundary
- the verification of ownership of the land
- the verification of the eligibility of the lands,
- the verification of the baseline land use, carbon stocks and land cover
- the verification of the leakage situation
- the verification of planting year, number of plants, species composition, growth and survival rate, protection measures and maintenance
- the verification of documentation and monitoring procedures
- the verification of consideration of labour rights and contracts
- validation of the information processes for generating, aggregating and reporting the selected monitored parameters
- validation of the monitoring processes, routines and documentations
- interviews of the operating staff and observation of appropriate operation and data collection procedures as well es risk of accidents/health and safety issues
- Interviews of farmers/community members in order to check the risks of displacement/livelihoods/access to ecosystem services/knowledge of the project activity, benefits, etc.

2.5 Resolution of Findings

Material discrepancies identified in the course of the verification are addressed either as CARs, CLs or FARs.

A **Corrective Action Request (CAR)** is established where:

- mistakes have been made in assumptions, application of the methodology or the project documentation which will have a direct influence on the project results,
- the requirements deemed relevant for verification of the project with certain characteristics have not been met, or
- there is a risk that the project would not be registered or that emission reductions would not be able to be verified and certified.

A **Clarification Request (CL)** will be issued where information is insufficient, unclear or not transparent enough to establish whether a requirement is met.

A **Forward Action Request (FAR)** will be issued when certain issues related to project implementation should be reviewed during the next verification. A detailed list of the CARs CLs and FAR raised and discussed in the course of this verification is included in Section 4 of this report.

In the course of the VCS validation, 09 Clarifications request (CL) and 02 Correction Action Requests (CAR) were raised and successfully closed. 01 Forward Action Requests (FAR) has been raised. In accordance with Sections 4.1.13 and 4.1.14 of the VCS Standard v4.3, all CARs and CLs issued during the validation process, and the inputs for their closure, are described in Appendix 2 of this report.

2.5.1 Forward Action Requests

Two Forward Action Requests were raised to the PPs during this process. See Appendix 2 for details.

3 VALIDATION FINDINGS

3.1 Project Details

3.1.1 Project type

The project is classified under sectoral scope 14 “Agriculture, Forestry and Land Use (AFOLU)”. As described in Section A1.1 of the VCS Standard, the project is eligible under the category of Afforestation, Reforestation, and Revegetation (ARR).

The project includes the direct planting of 2 clumping species of bamboo on degraded riverine buffer strips (5 m or 10 m) alongside rivers in Rwanda^{08/}. Areas with remaining patches of forests are excluded from planting activities.

The project has been identified as being a revegetation project as the area where the planting takes place has not been forest for at least the last 10 years and the Bamboo will not necessarily form a forest according to the Rwanda forestry definition.

See CL 02

3.1.2 Project design

The proposed project is designed as a VCS grouped project¹³ VCS Version 4.1

Eligibility criteria for the inclusion of new streams are described in the PD and found in line with the standard 3.5.15.

The core aspects are:

- No inclusion of wetlands
- No soil disturbances > 10%
- One baseline scenario is identified for all project activity instances.
- Same technology for land preparation, planting, maintenance and monitoring
- Same species of sympodial bamboo (*Bambusa textilis*, *Bambusa polymorpha*)
- All future Project activity instances face same barriers in regard to additionality

The audit team confirms entity information provided in the PD is in conformity to the VCS requirements.

3.1.3 Project proponent

Project proponent: EcoPlanet Bamboo Group, LLC

Other entities involved:

- EcoPlanet Bamboo Rwanda, Ltd, wholly owned subsidiary of EcoPlanet Bamboo Group, LLC which holds the long term lease to the project area.

The audit team confirms entity information provided in the PD is in conformity to the VCS requirements.

See CL 03

3.1.4 Ownership

The Project Proponent EcoPlanet Bamboo Group, LLC holds via its wholly owned subsidiary EcoPlanet Bamboo Rwanda Ltd.¹³ the legal right to control and operate all project activities for the duration of the crediting period. This includes the contractual right to the implement the proposed project activities, along with the associated ownership of the GHG emission removals.

This is evidenced by a Memorandum of Understanding⁰⁵ and a Letter of Authorization⁰⁶ both issued by the Rwanda Water Resource Board RWB. The RWB is the governmental authority that holds the legal rights on the buffer strips alongside the rivers in Rwanda. This is evidenced by Rwanda Law no. 272021 of 10062021²² and Rwanda Ministerial Order No. 00716.01 of

15072010/08/ and confirmed during the onsite inspection via interviews with representatives of the RWB/IM03/IM04/. The LoA covers the restoration of 1000 ha of buffer zones.

TÜV Nord confirms the ownership as described above. The conclusion is based on the review of information and documents provided by the PP and verified by interviews with representatives of the RWB/IM03/IM04/.

3.1.5 Project start date

The project start date is 01/10/2022, which corresponds to the planned date of the first planting. At the time of the audit no planting had been conducted, but the seedlings were already raised in the nurseries. This was confirmed by visual inspections of the nursery, interviews with local authorities, managers and caretakers. First planting is foreseen with the start of the rainy season in October. This is conservative as the seedlings were already growing (in the nurseries) during the onsite visit in July 2022. [Subsequent to the validation audit, the PP provided additional confirmation of the first planting beginning as planned in October 2022, through the provision of photos.](#)

3.1.6 Project Crediting Period

The proposed project crediting period is 20 years and is a fixed crediting period. [The crediting period has been justified due to the rapid removals associated with the bamboo species being planted. All projected carbon removal benefits are expected to be realized within a 20 year crediting period. At the same time the PP has demonstrated longevity as required for permanence within the NPRR/02/. Therefore the project crediting period of 20 years is justifiable.](#) In addition, the PP has proven long term experience in setting up and maintaining bamboo plantations due to various projects, among other the VCS/CCBA registered “EcoPlanet Bamboo Central America” ID 1085, validated 2013.

No indication has been detected that the crediting period could not reach 20 years.

Project start date: 01/10/2022

Project end date: 30/09/2042

3.1.7 Project Scale and Estimated GHG Emission Reductions or Removals

The project is classified as “project” according to its scale (less than or equal to 300,000 tonnes of CO₂e per year) since it will remove an estimated average of 51,964tCO₂e per year and a total of 1,039,272tCO₂e during the 20 years of crediting period/01/04/

3.1.8 Project location

The project is located across three adjoining districts in Two provinces: Muhanga District in Southern Province, Ruhango District in Southern Province and Karongi District in Eastern Province. The location is described in the PD/^{04/} KML files of the project location have been provided/^{03/}. Project area eligible for planting bamboo and accounting for VERs is clearly defined but differs slightly from common practice in A/R projects. The carbon accounting will be executed on individual clump base and as a second step the project area will be calculated on base of the standing area if a clump (5m x 5m = 25 m). The general area map is provided by the government authority RWB. Based on that, EcoPlanet developed the Project Area KML files which had been provided along with a breakdown of each polygon. Roads, camps, rocky areas etc. will not be part the project area at verification.

The validation audit occurred prior to the project start date and all final documents were submitted prior to the completion of the 2022 planting season. Given this timeframe, the audit team visited at random areas that were intended to be planted within the 1st planting instance, but in advance of the final ground truthing. Visits to the small pilot plantings that occurred in advance of the proposed project were carried out to confirm how areas such as infrastructure or where individual standing trees occurred were left out of planting.

Eligible areas will be mapped prior to ground truthing. Ground truthing prior to land preparation activities then occurs by a dedicated team of technicians prior to planting. These areas are then provided to the project's supervisors prior to the start of land preparation. However, given the extremely difficult terrain and the disjointed nature of eligible areas, project areas can only be finalized at the end of each planting season and are subject of verification at each verification event.

As common in grouped projects, additionality aspects are subject of verification at each verification event. Hence, FAR 02 has been raced.

See CL 04, FAR 02.

The provided data has been crosschecked via comparison analysis with public available satellite images/^{37/} and verified during the field inspection doublecheck with collected GPS data/^{09/21/}.

3.1.9 Conditions prior to project initiation

Regarding conditions prior to the project initiation, the PD describes in a complete way the climate, hydrology, topography, relevant historic conditions, soils, vegetation and ecosystems for the areas involved in the project.

The bamboo is planted alongside severely degraded edges of streams and rivers in collaboration and under supervision of the RWB /05/06/07/. In very few places there is existing wooden vegetation, that stabilize the riverbank. This is described in detail in the PD and has been verified by the audit team during the on-site visit by document review, field inspection and interviews conducted /09/10/.

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3.1.10 Compliance with Laws, Statutes and Other Regulatory Frameworks

Section 1.14 of the PD provides information related to the compliance with the applicable laws, statutes and other regulatory frameworks. The main and relevant national Laws international legislation are described, and their enforcement analysed in appendix 1 of the PD. According to the information provided and assessed during the audit, the project fulfils the laws mentioned in the PD. This has been verified by interviews with representatives of the RWB in the headquarter in Kigali /IM03/IM04/ and on site with technical Staff of the RWB in the field /IM07/. Thus, TÜV Nord considers that project complies with applicable laws, statutes, and other regulatory frameworks.

3.1.11 Participation under other GHG programs

The project is not registered or seeking registration under any other GHG program.

The project has not been rejected by another GHG program.

The audit team confirms compliance with the standard requirements /APPENDIX III/.

3.1.12 Other forms of credit

The emission removals resulting from the project are not included in any emissions trading program or other binding limits. The PP holds the explicit carbon rights as agreed with the Rwandan Government Authority of RWB /05/06/.

The project has not sought nor received another form of GHG-related environmental credit and is not eligible to participate in any such program.

The audit team confirms compliance with the standard requirements by document review /05/06/ and interview with Musana S. Bernard, Head of Knowledge and Forecasting Department of Rwanda Water Resource Board //APPENDIX III/.

3.1.13 Sustainable development contributions

Rwanda has adopted and is implementing Vision 2050 along with other key National Development plans including the Economic Development and Poverty Reduction (EPDRS) and

the Green Growth and Climate Resilience Strategy. The Project activity contributes to the Rwanda's national development plans by:

1. Controlling erosion through the revegetation of sensitive riparian lands;
2. Increasing the countries forest cover and thereby contributing to its forest landscape restoration goals (FLR) within a relatively short time frame;
3. Providing livelihoods for farmers that complement national development plans;
4. Creating jobs, upskilling for local youths and contributing to the tax base of the local and national government;
5. Improving water quality which will reduce the cost of water filtration and make access to clean water more attainable; and
6. Improve water quality to improve the efficiency of hydropower and irrigation, supporting energy and food security.

The PD explains how project activities will result in expected SD contribution. There is no requirement for provisions for monitoring and reporting same.

Furthermore, the project activities positively contributing to achieving the following Sustainable Development Goals:

1: No poverty, 6: Clean water and sanitation, 8: Decent work and economic growth, 13: Climate action,

Further Information:

EcoPlanet reports annually on its contribution to these aspects as part of its United Nation's Global Compact, monitoring of NDGs will be implemented.

Thus, the audit team confirms compliance with the standard requirements under consideration of observations made at the onsite visit, documents reviewed, field inspections and interviews conducted^{/09/10/}.

3.1.14 Additional information relevant to the project

Leakage management for AFOLU projects:

According to the applicable methodology only leakage due to the displacement of agricultural activities shall be considered. The project does not displace pre-project agricultural activities. Thus, neither a leakage management plan nor leakage mitigation measures are required.

Commercially sensitive information:

Commercially sensitive information surrounding the financing arrangements of the project have been excluded from the PD and the associated Non Permanence Risk Assessment. The audit team had access to all documents during the onsite visit. Confidential documents are:

- VER Purchase Agreement, Rwanda Riparian Restoration Project, March 19th, 2022^{/32/}

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See CL 05.

Conclusion:

TÜV Nord assessed the project details as described above through the review of the project design document, supporting evidence provided as well as field inspections and interviews conducted during the onsite visit. TÜV Nord confirms the accurateness and completeness of the provided project description.

3.2 Safeguards

3.2.1 No Net Harm

The project is utilizing non-native species of clumping (sympodial) bamboo to restore and secure the riverbanks, while conserving all remaining standing trees. The local bamboo species are described as not suitable for the project location and the purpose of stabilizing the riverbanks by their soil binding root system. Rwanda Water Board promotes the use of *Bambusa polymorpha* and *Bambusa textilis* as well as similar species of the same genus for riparian restoration. As these species are sympodial, or clumping bamboo species there is no risk of invasiveness through rhizome growth.

No negative environmental or socio-economic impacts due to the project activity are described. In terms of ecological aspects, the most important benefits are described as follows :

- Select bamboo species are planted that have tight root structures to quickly bind soils and stabilize riverbanks to reduce flooding on surrounding farmland.
- The bamboo creates microclimates that controls temperature fluctuations and stabilizes rainfall benefiting farmers.
- The bamboo controls the flow of rainfall from sky to soil, reducing runoff and slowing the flow of water into rivers.

Socio economic impacts are described as:

- Long term and secure employment allow additional funds to flow into communities where previously few opportunities existed;
- Improved farming as the loss of topsoil is controlled and riverbank flooding minimized by the planted bamboo;

- Empowerment of women as the project works to empower women, which in turn results in an increase in community spending on critical development aspects such as health and education;
- Secondary opportunities as the project supports secondary opportunities that arise to service the project's operations by sourcing goods and services locally.

TÜV Nord confirms the Projects potential positive environmental and socio-economic impacts through document review, field visits and interviews with Community members and government authorities^{/09/10/}.

3.2.2 Local Stakeholder Consultation

Procedures for engaging local stakeholders are described in the PD. Two types of local stakeholder were identified as the Government of Rwanda and local communities. This is explained due to the ownership of the land (Gov of Rwanda) and the narrowness of the riverine strip (5m). EcoPlanet Bamboo engaged Rwanda Water Board with an opportunity to expand the pilot Secoko Catchment Restoration to neighbouring watersheds through carbon financing. First consultations took place in February 2022. The design of the Project was developed in collaboration with RWB and finalized with the assignment of the MoU and the LoA^{/05/06/}. EcoPlanet Bamboo is the sole implementing entity and hence serving as operator responsible for implementation and management of the project activity whilst Rwanda Water Board providing the legal framework.

Stakeholder consultations are conducted following existing administrative structures that were already used during the implementation of the riparian restoration pilot project before.

1. RWB as the responsible governmental authority for watershed management has existing agreements with all district authorities.
2. District authorities are in this context responsible for controlling illegal activities regarding the protection of rivers.
3. District governments consult the sector governments which are responsible for community engagement. Sector Governments work closely together with Cell- and Village Governments, who operate underneath them and who are given the mandate to communicate project activities at monthly community meetings in each affected village.

Detailed information is provided in the PD.

Communication and interaction with the RWB as core stakeholder concerning project design and implementation, risks, costs and benefits, relevant laws and regulations and the process of VCS Program validation are well organized. In the course of the audit the audit team assessed provided documentation and conducted meetings and following interviews on the different levels. This was, among others, to confirm, that the PP considered the inputs made during the

stakeholder consultation process in an appropriate way and to assure, that there are no significant outstanding issues

- Rwanda Water Resource Board, Office of the Prime Minister, Kigali:
 - o Documents:
 - Final Handover Report; Supplying the Riparian and Gully Restoration with Specialized Bamboo Species for the Secoko Sub Catchment, 13.04.2022^{/46/}. This report provided recommendations and lessons learned from the pilot project, that were then used to guide the framework and design of the proposed project activity.
 - o Interview with key representatives from the RWB to discuss, among other aspects, how stakeholder information was used and incorporated into project design^{/10/}.
 - Head of Knowledge and Forecasting Department
 - Catchments Restoration and Erosion Control Division Manager
- Rwanda Water Resource Board, District Government:
 - o Documents:
 - Minute meetings for all District & Sector meetings^{/44/}. These reports include specific answers and questions that were raised during such stakeholder meetings;
 - o Interview with District level individuals to gain feedback on the project.^{/10/}.
 - Agronomist Specialist
- Communities - Villages of Nyanyungo and Vungo:
 -
 - o Documents:
 - Minute meetings for all District & Sector meetings^{/44/}. These reports include specific answers and questions that were raised during such stakeholder meetings;
 - The PP undertook a socio-economic baseline assessment within the surrounding communities in order to provide data on the livelihoods, incomes and status of the farmers surrounding the project areas. This information has been used to guide the project design^{/43/45/47/}.
 - o Interviews: As already described, communities have no right to the land on which project activities occur. Knowledge of this and the government ownership of riparian buffer zones was confirmed through extensive interviews with farmers as part of the field visits. Interviews with unskilled workers engaged in the project activities were carried out to gain feedback and determine if such feedback was incorporated by the project proponent.^{/10/}.
 - Village Chiefs
 - Community members
- EcoPlanet Bamboo:

- CDO
- Plantation, Operations, Finance Manager
- Staff

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Thereby information provided in the PD and other documentation was verified and found in compliance with the requirements. Therefore, the audit team confirms that the PP considered the inputs made during the stakeholder consultation process in an appropriate way and that there are no significant outstanding issues.

As verified in meeting with the RWB, the project does not require any environmental impact assessment to be carried out under applicable legislation of the host country^{IM03/IM04/}.

3.2.3 Public Comments

No public comments were received through the Verra Platform during the public comment period from 30/06/2022 to 30/07/2022 <https://registry.verra.org/app/projectDetail/VCS/3072>

3.2.4 AFOLU-Specific Safeguards

As there is no VERRA/VCS definition of stakeholders, the PP uses the following: “A person or party that has an interest in a company and can either affect or be affected by the business”^{/36/}. The PD describes the following relevant stakeholder aspects:

- Stakeholder Identification and background

The project is being carried out on state lands in public domain^{/22/}, that is legally classified as riverbanks and administered by the RWB by law^{/08/}. All resource rights are with this authority. There are no communities or individuals living within these areas.

Eternal stakeholders:

- The Government of Rwanda
 - o Rwanda Water Resource Board (RWB)
 - o District Government
 - o Sector, Cell and Village Government
- Communities within the Catchment
- ClimatePartner

Internal Stakeholder:

- Employees
- Risks, Costs and Benefits to Stakeholders:

Potential Risks are identified and described in the PD as loss of bamboo clumps due to extreme erosion, damage by community livestock and illegal farming in the buffer zone. Mitigation measures are described.

- Respect to Stakeholders Resources: Validation Report: VCS Version 4.1

The PD describes the property rights and ecosystem aspect. The Rwanda Water Resource Board as the core stakeholder developed the design including the use of the non-native species^{/10/}.

- Procedures for On-Going Stakeholder Communication

The PD describes ongoing communication and consultations strategies. These procedures include EH&S Standard Operating Procedure #7 “Communication Procedure”, which specifically deals with stakeholder consultations.

The project has a Conflict Resolution/Grievance Mechanism^{/24/} in place.

At the time of validation project activities were limited to nursery operations. As a result, the audit team confirmed that the project meets the requirements of AFOLU-Specific Safeguards through the following:

- a. By carrying out on site visits to the pilot project that was carried out in the same manner and the same activities to confirm that no change in access occurs to either the adjacent farmlands or the water resource in the adjacent rivers;
- b. By observing the relationship between farmers working in the fields adjacent to the pilot plantings and the project teams;
- c. By interviewing farmers that were involved in the pilot project to assess their response to the project;
- d. By interviewing key stakeholders at the district and sector level to ensure that the project had a positive response.

Further aspects of verification have been described in detail in section 2.2.2 of the VR.

The audit team confirms the conclusion of the PP that the project activity has no significant negative impacts on local stakeholders considering project and supporting documentation, field observations and information gathered through interviews with RWB, Members of Communities, employees and the project team^{/10/}. This is also plausible as the project includes only a small strip of 5 meters along the rivers. All parties visited were aware of the project activity and the validation audit.

3.3 Application of Methodology

3.3.1 Title and Reference

The project applies the below approved CDM methodology: CDM Methodology Version 4.1

AR-ACM0003 A/R Large-scale Consolidated Methodology: Afforestation and reforestation of lands except wetlands Version 02.0

The methodology requires the use of certain tools: A complete list of all A/R methodological tools applicable to the project activity and the considered carbon sinks is provided in the PD.

Further tools connected to this methodology are not applicable to the specific project conditions. All tools are described under 3.3.2.

3.3.2 Applicability

The audit team has reviewed the explanation provided in the project design document for demonstrating that the project activity meets the requirements of the applicability criteria of the methodology. The following table gives TÜV NORD JI/CDM CP's assessment on the justification provided.

Applicability condition	TÜV Nord assessment and justification
<p>The land subject to the project activity does not fall in wetland category</p>	<p>The planting takes place on degraded riverbanks in order to restore the damaged land predominantly against soil erosion. Existing woody vegetation or intact wetlands are not included which could be observed during the onsite visit^{09/10/}.</p> <p>This was confirmed by interviewing the RWB, field staff, technical staff.</p>
<p>Soil disturbance attributable to the project activity does not cover more than 10 per cent of area in each of the following types of land, when these lands are included within the project boundary:</p> <ul style="list-style-type: none"> i. Land containing organic soils; ii. Land which, in the baseline, is subjected to land-use and 	<p>During the site visit it could be observed that the project activity did not result in any kind of soil disturbances above 10% of the area.</p> <p>Ploughing is not applied. The bamboo is planted in hand dig holes 30 x 30 x 30 cm. Spacing is 5 m x 5 m.</p> <p>This was confirmed by interviewing the field staff, technical staff, plantation managers^{09/10/}.</p>

management practices and receives inputs listed in appendices 1 and 2 to the methodology.

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Methodological tools	TÜV Nord assessment and justification
Combined tool to identify the baseline scenario and demonstrate additionality	The applicability condition of this tool is assessed and explained in sections 3.3.4 and 3.3.5 of this report.
Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity	There are no applicability conditions contained in this tool.
Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities” (version 04.2);	Optional; no justifications required
Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities	Optional; Project area does not include wetlands or organic soils. The project area is characterized as riparian buffer zones ^{8/} . Soils are classified as Cambisol, Ferralsols and Nitrisol. Soil disturbances are insignificant. This was confirmed by interviewing the RWB, field staff, technical staff, plantation managers and side inspections.
Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities	Optional; no displacement of agricultural activities that causes drainage of wetlands; occurrence of uncontrolled fires in the baseline. This was confirmed by interviewing the RWB, field staff, technical staff, plantation managers and side inspections.
Estimation of non-CO2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity”, version 4.0	Optional; not applied due to the specific project conditions. Fire is not applied for e.g., land preparation.
Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/ R CDM project activities	Project area does not include wetlands or organic soils. The project area is characterized as riparian buffer zones ^{8/} . Soils are classified as Cambisol, Ferralsols and Nitrisol. Soil disturbances are insignificant. This was

	confirmed by interviewing the RWB, field staff, technical staff, plantation managers and side inspections.
Tool for demonstrating appropriateness of allometric equations for estimation of aboveground tree biomass in A/ R CDM project activities	There are no applicability conditions contained in this tool. Optional; not referenced in the methodology
Calculation of the number of sample plots for measurements within A/R CDM project activities	There are no applicability conditions contained in this tool. Optional; not referenced in the methodology
Tool for the calculation of the number of sample plots for measurements within in A/R CDM project activities (optional) ✓	There are no applicability conditions contained in this tool. Optional; not referenced in the methodology

TÜV Nord, based on records provided including spreadsheets estimations of the emissions reductions, has verified that applicability conditions of the different tools are complied. In conclusion, the project activity complies with the applicability conditions of the methodology, and tools selected by the PP.

See CL 06

3.3.3 Project Boundary

The PP has provided the details of the project area in the PD. The proposed project activity plants more than 400,000 Bamboo clumps alongside rivers, administered by the RWB. The physical Project Boundary is defined by 5 meter buffer strip alongside the rivers. Shapefiles^{/03/} are provided and in line with the agreement and supporting documentation^{/05/06/08/22/}. Further description is provided in section 3.1.8.

See CL 07

The documents were thoroughly assessed by the audit team checking the eligibility assessment of the project area by using Google earth imagery and verified during the onsite visit and interviews with the representatives of the RWB^{/09/10/}.

In accordance with the methodology applied and its corresponding tools, the following GHG sources, sinks and reservoirs for the project and baseline scenarios:

Source	Gas	Included?	Explanation/Justification
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		Baseline		
		GHG Source	Required	Notes
Baseline	Above and Below Ground Biomass	CO ₂	Yes	Carbon stock in above and below ground biomass is expected to decrease in the baseline scenario. The project assumes a zero value for this carbon pool, assumed to be conservative.
		CH ₄	No	GHG source not required by the methodology
		N ₂ O	No	GHG source not required by the methodology
	Soil Carbon	CO ₂	No	The methodology determines that this carbon pool is optional. SOC expected to decrease in the baseline scenario, therefore exclusion results in conservative approach.
		CH ₄	No	GHG source not required by the methodology
		N ₂ O	No	GHG source not required by the methodology
	Dead Wood and Litter	CO ₂	No	The methodology determines that this carbon pool is optional. Dead wood and litter are expected to decrease in the baseline scenario, therefore exclusion results in conservative approach.
		CH ₄	No	GHG source not required by the methodology
		N ₂ O	No	GHG source not required by the methodology
Project	Above and Below Ground Biomass	CO ₂	Yes	Carbon stock in above and below ground biomass is expected to increase as a direct result of implementation of the project activities
		CH ₄	No	GHG source not required by the methodology
		N ₂ O	No	GHG source not required by the methodology
	Soil Carbon	CO ₂	Yes	The methodology determines that this carbon pool is optional. SOC is expected to increase as a result of the project activities. Omitting it results in a conservative assessment of total GHG benefits.
		CH ₄	No	GHG source not required by the methodology
		N ₂ O	No	GHG source not required by the methodology
	Dead Wood	CO ₂	No	The methodology determines that this carbon pool is optional. Dead wood is not expected to change significantly as a result of the project activities.

		CH ₄	No	GHG source not required by the methodology
		N ₂ O	No	GHG source not required by the methodology
	Litter	CO ₂	Yes	Bamboo clumps drop significant volumes of leafy material each year, resulting in an increase in this carbon pool.
		CH ₄	No	GHG source not required by the methodology
		N ₂ O	No	GHG source not required by the methodology

Emission sources are excluded as the Project Activity does not include the burning of woody biomass for the purpose of site preparation, or as part of forest management.

TÜV NORD confirms that the project boundary and selected sources, sinks and reservoirs are justified for the project.

3.3.4 Baseline Scenario

The methodology requires the use of a CDM tool for the determination of the baseline scenario. However, the project proponent has, as per the VCS rules and regulations, chosen to use the VCS adapted version “Tool for the demonstration and assessment of additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) project activities” (Version 3.0, 2012). This tool requires the undertaking of a four step process. Step 1 refers to the identification of the Baseline Scenario.

STEP 1. Identification of alternative scenarios

Sub-step 1a. Identify credible alternative land use scenarios to the AFOLU project activity

Detailed information is provided in the PD.

“Rwanda is a small land locked nation, with a rolling topography. The majority of the country’s landscapes are dominated by smallholder farming plots. There are few standing forests or native vegetation remaining, outside of clearly designated protected areas and reserves^{19/}. The proposed project activities are occurring on narrow strips of land classified as riparian buffer zones, representing those lands that are directly adjacent to various water resources, both lakes and rivers of varying sizes. These lands were designated as state lands in 2010 and relevant laws implemented to manage their use and restrict uses to those that protect or conserve these fragile lands. The project areas are defined by the type and size of the water body they buffer and are classified as follows:

- 50m buffer zones for lakeshores

- 10m buffer zones for big rivers
- 5m buffer zones for small rivers
- 2m buffer zones for unclassified rivers.”

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At the present stage, only small rivers are included in the Project.

Respective information is provided in the PD and supporting documents^{10/}.

Outcome of Sub-step 1a:

The following alternative land use scenarios have been identified as the plausible land use scenarios:

1. Continuation of pre-project land use
2. Conversion to small scale agricultural activities
3. The current project activity without being registered as an AFOLU project

The mentioned alternative land use scenarios were checked during the site visit and confirmed by interviews, site observations and document review^{09/10/}. The continuation of the pre-project is by far the most likely land use scenario for the project area.

No other possible alternative scenarios have been identified and appear reasonable for the project areas.

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

The proposed project is occurring on land that is legally classified as Riparian Buffer Zones since 2010^{08/22/}. According to the law they shall be protected or repaired.

Applicable laws or regulations are identified and described that that would prevent scenario 2. All agricultural and livestock activities are prohibited in such riparian buffer zones, as determined by law No. 48/2018 of 13/08/2018. Respective information has been provided in the PD and had been cross checked via the onsite visit by document review, interviews and observations made during a field visit.

Therefore, the plausible alternative land use scenarios remain as follows:

1. Continuation of the pre-project land use
3. The current project activity without being registered as an AFOLU project.

Sub-step 1c. Selection of the baseline scenario

A justification of the selection of the baseline scenario is provided in the PD with the following outcome:

Continuation of pre-project land use

Project stratification:

No baseline stratification is required according to the description provided in the PD,
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TÜV Nord confirms that the identified baseline scenarios “Continuation of the pre-project land use” is justified. The conclusion is based on the review of information provided by the PP and verified on observations made during the onsite visit by interviews and field inspections.

3.3.5 Additionality

As already described under 3.3.4 the PP uses the adapted VCS version “Tool for the demonstration and assessment of additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) project activities” (Version 3.0, 2012).

STEP 2. Investment analysis:

Simple cost analysis is correctly applied as the project activity is a purely conservation activity. No commercial harvesting and no economic returns is expected from these riparian bamboo plantings.

STEP 3. Barrier analysis; not applied

STEP 4. Common practice analysis

A study conducted in 2017^{/12/} shows that between 2007 and 2017 523 ha of riverine planting was done, but with a low rate of success of the plantings due to insecure funding for maintenance, poor quality of the planting material and organizational failure. The described activities can be in general compared to the proposed project activity, but there are obvious differences in respect to scale, structure and complexity. A description and assessment is provided in the PD. Furthermore, the PD describes that the afforestation is not mandated. This has been verified by the audit team during the onsite visit using the following means:

Review of respective legislation: In the Rwanda Water Resource Board Strategic Plan the Afforestation activities are described as Strategic Objective, but not as mandatory^{/07/}. Rwanda Ministerial Order No. 00716.01 of 15072010^{/08/}, Rwanda Law no. 272021 of 10062021^{/22/} and the Erosion Control mapping report_2020^{/42/} do also not indicate any mandatory action as implemented by the PP. The above was verified during interview with the responsible persons at the governmental authority Rwanda Water Board in Kigali^{/10/} and confirmed by observations made by the auditor during the field visits.

See CL 08

Conclusion:

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In view of the above TÜV NORD JI/CDM CP confirms that i) the project activity would not be a common practice in the geographical region of the assessment and ii) is not the baseline scenario. Thus, TÜV NORD JI/CDM CP confirms, that the proposed project activity is additional in compliance with the VCS tool VT0001 “Tool for the demonstration and assessment of additionality in VCS agriculture, forestry and other land use (AFOLU) project activities, Version 3.0”.

TÜV NORD JI/CDM CP confirms that all data, rationales, assumptions, justifications, and documentation provided by the project participants to support demonstration of additionality are credible and reliable, which was checked and verified at the time of validation. TÜV NORD JI/CDM CP considers the reasoning for the proposed project additionality demonstration is credible and reasonable i.e., the proposed project has the ability to reduce anthropogenic emissions of greenhouse gases by sources below those that would have occurred in the absence of the registered VCS ARR project activity. Without the income from VCUs the project will not be implemented as described.

3.3.6 Quantification of GHG Emission Reductions and Removals

Procedures for quantifying the GHG emission reductions and removals generated by the project during the project crediting period were conducted in accordance with the methodology “AR-ACM0003: Afforestation and reforestation of lands except wetlands”, Version 02.0. The validation team performed an intensive quantification review of all input data, parameters, formulas, calculations, conversions, statistics and resulting uncertainties and output data to ensure consistency with the VCS documentation, methodology modules, and the PD.

Furthermore, the validation team reproduced calculations for selected samples to ensure accuracy of the results. Conversion factors, formulas, and calculations were provided by the PP in spreadsheet format to ensure all formulas were accessible for review. The validation team recalculated subsets of the analysis to confirm correctness. Where applicable, references for analysis methods or default values were checked against relevant scientific literature for best practice.

Quantification of baseline emissions:

Baseline net GHG removals by sinks are calculated using equation 1 of the applied methodology AR-ACM0003:

$$\Delta C_{BSL,t} = \Delta C_{TREE_BSL,t} + \Delta C_{SHRUB_BSL,t} + \Delta C_{DW_BSL,t} + \Delta C_{LI_BSL,t}$$

The baseline emissions for the project areas are those associated with negative land use change. A comparison analysis of the land cover conducted indicates that there is a decrease in areas of standing trees – from a conglomerated 55.9ha in 2012 to 49.2ha in 2022^{/01/}. Under the conditions of the applied methodology, changes in carbon stock of above-ground and below-ground biomass of non-tree vegetation, dead wood, litter and soil organic pools are conservatively assumed to be zero for all strata in the baseline scenario:

$$\Delta C_{DW_BSL,t} = 0$$

$$\Delta C_{LI_BSL,t} = 0$$

Also changes in carbon stock of above-ground and below-ground biomass of shrub vegetation are conservatively assumed to be zero for all strata in the baseline scenario:

$$\Delta C_{SHRUB_BSL,t} = 0$$

Tree Biomass: It has been demonstrated by GIS and remote sensing analysis^{/01/} that in the absence of the proposed project activity tree cutting for would continue and therefore remaining tree-cover would decrease overtime. The likelihood of tree cover increasing in the business as usual baseline scenario is considered not realistic due to increasing deforestation and pressure on existing forests^{/09/10/19}. On the opposite every existing tree in the project area will be left untouched and GIS mapped.

Hence in the absence of the project, changes in tree biomass are rather expected to decrease in above ground and below ground carbon stock due to biomass loss and therefore may be conservatively assumed to be zero.

$$\Delta C_{TREE_BSL,t} = 0$$

Therefore the baseline net GHG removal by sinks is zero: $\Delta C_{BSL,t} = 0$

See CL 09

Quantification of project emissions:

Ex-ante actual net GHG removals by sinks are calculated using Equation 2 and 3 of the applied methodology AR-ACM0003.

Ex ante stratification is determined by planting year and species.

The carbon calculation of the bamboo planted is based on the individual number of clumps and not on area. Only bamboo is considered in the quantification of the project's ex ante carbon calculation. As the bamboo clump biomass is very clearly distinguished from standing trees, such non bamboo biomass (trees) is conservatively removed from all calculations associated with the actual net GHG removals by sinks, as well as from the project's carbon monitoring plan.

According to the methodology “GHG emissions resulting from the removal of herbaceous vegetation, combustion of fuel, fertilizer application, use of wood, decomposition of litter and fine roots of N-fixing trees, construction of access roads within the project boundary and transportation attributable to the project activity shall be considered insignificant and therefore accounted as zero”.

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The actual net GHG removals by sinks are limited to changes in the carbon stock attributed to the planted bamboo clumps within the project areas.

These actual net GHG removals by the bamboo clump sinks are calculated as:

$$\Delta C_{ACTUAL,t} = \Delta C_{P,t} - GHG_{E,t} \quad \text{Equation (2)}$$

The increase in non-CO2 GHG emissions within the project boundary, as a result of the implementation of the ARR project activity $GHG_{E,t}$ is accounted as zero, as the project activities do not include the use of fire for land preparation activities as highlighted in the relevant tool.

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

The change in the carbon stocks in the project, occurring in the selected carbon pools in year t , is calculated using equation (3) of the methodology. There “bamboo” has been used in clarification of “trees” within this equation.

$$\Delta C_{P,t} = \Delta C_{BAMBOO_PROJ,t} + \Delta C_{SHRUB_PROJ,t} + \Delta C_{DW_PROJ,t} + \Delta C_{LI_PROJ,t} + \Delta SOC_{AL,t} \quad \text{Equation (3)}$$

Due to the specific characteristics of the project activity and the growth pattern of the sympodial bamboo species being grown, the conditions of the methodology, as well as difficulties in measurement options the following carbon pools are conservatively assumed to be zero.

$$\Delta C_{SHRUB_PROJ,t} = 0$$

$$\Delta C_{DW_PROJ,t} = 0$$

Changes in Bamboo Carbon Stock due to Project Activities

Change in carbon stock of the bamboo planted as a direct result of project activities is estimated as follows:

$$\Delta C_{BAMBOO_PROJ,t} = (\Delta C_{BAMBOO,t2} - (\Delta C_{BAMBOO,t1}) / T \quad \text{Equation (4)}$$

Calculation of Bamboo Carbon Stock

There are two carbon pools that are being quantified and monitored:

1. Bamboo Above Ground Biomass (AGB) – this pool consists of bamboo culms, branches and auxiliary leafy material;

2. Bamboo Below Ground Biomass (BGB) – this pool consists of bamboo rhizomes and extensive root networks;

Considering the wide spatial distribution of bamboo clumps being planted and the uniqueness of the plant compared to trees, the project proponents use a Bamboo Clump as the unit of measure for the calculation of changes in bamboo biomass and therefore carbon removals.

For each species under consideration, the bamboo carbon stock at any point in time is calculated as follows:

$$C_{\text{BAMBOO_CLUMP}} = \text{AGB}_{\text{CLUMP}} * \text{RS} * \text{CF}$$

$C_{\text{BAMBOO_CLUMP}}$ = Carbon stocks in a bamboo clump, in year t; tC;

$\text{AGB}_{\text{CLUMP}}$ = The bone dry above ground biomass included in a bamboo clump, including all bamboo culms, branches and leafy material, in year t; tons

RS = The Root to Shoot ratio of a bamboo clump, used to calculate the below ground biomass represented by bamboo rhizomes and roots and measured in tons, in year t; tons

CF = The carbon fraction of woody biomass, given as 0.47

Determination of Above Ground Biomass: $\text{AGB}_{\text{CLUMP}}$

The detailed description as provided in the PD is included in this report, as it is essential to comprehend the difference between tree and bamboo in relation to the adaptation of the carbon calculation: “The first unique variable to be considered is that a bamboo clump consists of multiple culms. In contrast to a tree, these culms do not increase in diameter year on year, but rather emerge from the ground at their maximum diameter and achieve their maximum height within their first year of growth. Each year that the bamboo clump grows, additional culms emerge representing an increase in the AGB pool. Therefore, the first variable that requires measurement in order to report on changes in biomass due to the project planting activities, is the total number of culms in the clump, and the average biomass within those culms. This can be calculated using allometric equations where the total biomass of the culm is a factor of the diameter of that culm.” IPCC does not provide guidance on biomass assessment of bamboo forests, and availability of data like species specific allometric equations for the determination of biomass utilizing culm and diameter as parameters measures are very limited. Therefore, the PP developed species specific allometric equations for the following species by destructive sampling.

- Bambusa polymorpha
- Bambusa textilis

This process of destructive sampling is described in the PD. The development of the allometric equation follows the Tool for “Demonstrating Appropriateness of Allometric Equations for Estimation of Aboveground Tree Biomass in A/R CDM Project Activities” UNFCCC/CCNUCC 2011. The Assessments have been checked for consistency and found in compliance with the requirements of the tool/^{25/56/}. Validation Report: VCS Version 4.1

See also the description provided under section 3.3.7 Methodology deviation and in the PRR.

As each bamboo clump is comprised of multiple individual culms, the total above ground biomass of a single clump is a factor of the number of culms within that clump.

$$AGB_{CLUMP} = (AGB_{CULM} * MC * N_{CULM})$$

AGB_{CLUMP} = Above ground biomass of the bamboo clump at time t; tons

AGB_{CULM} = The above ground biomass of an individual culm, calculated using the allometric equation as described above; tons

MC = The moisture content of the bamboo biomass; %

N_{CULM} = The number of culms found within the bamboo clump at time t;

Dendrometric Variables

A detailed description how the determination of the biomass for the two different bamboo species has been assessed is provided in the PD. No species specific allometric equations have been found available for the species being grown – therefore it is not possible to provide a “verifiable source” to confirm such absence of existing equations. Nevertheless, comparison with data from an article published in the BAMBOO JOURNAL, No. 29 March 2015/^{41/} shows the identical value for 5 year old *Dendrocalamus asper* propagated by rhizome cutting tC/ha as calculated by the PP /^{04/}: 41 tC. However, number of clumps/ha and culms/clump differ. The PD refers to a document/^{25/26/} in which a qualified 3rd party was engaged for the development of the allometric equation. This paper follows the relevant tool, including detailed description of why the equation chosen was the most scientifically rigorous, along with its adherence to a conservative approach. 6a: “The equation was derived from a data set of at least 30 sample trees, and the value of coefficient of determination (R²) obtained was not less than 0.85.” /^{37/}. Review of the excel data collection sheet “Destructive Sampling”/Bambusa balcooa and “Destructive Sampling”/Bambusa textilis spp along with photographic evidence provided was used as additional source of verification/^{38/39/40/}.

Finally, - Following the guidance provided by CDM tool/^{37/}: 5. “For ex ante estimation of aboveground tree biomass in project scenario any allometric equation can be used.”

Available data, sources and literature was evaluated by the auditor and crosschecked with information gathered during field visits^{9/} and interviews conducted^{10/}.

Conservativeness of data has been considered. Validation Report: VCS Version 4.1

See CL 10

Calculation of Changes in Soil Organic Carbon

A detailed description is provided in the PD. The PP applied the “Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities” Version 01.1.0.” Following input values have been selected and verified for the calculation of the SOC stock:

- Soil Stratum: Climatic Region: topical-mountain/Soil Type: Low Activity Clay (LAC)
- Pre Project Activities: Land use: Grassland; Management: Severely degraded; Input: low

The SOC stock at the start of the project is estimated using the following equation:

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

$$SOC_{initial,i} = 44 \text{ tCha}^{-1}$$

The rate of change in SOC stock in project scenario until the steady state SOC is reached is calculated with the following equation:

$$dSOC_{t,i} = \left(\frac{SOC_{REF,i} - SOC_{INITIAL,i} - SOC_{LOSS,i}}{20 \text{ years}} \right)^2 \text{ for } t_{PREP,i} < t \leq t_{PREP,i} + 20$$

$$dSOC_{t,i} = 0,95 \text{ tCha}^{-1}$$

The project scenario results in the rate of change of SOC being >0.8. Therefore, as per the specifications of the tool, if:

$$dSOC_{t,i} > 0.8 \text{ then } dSOC_{t,i} = 0.8 \text{ tC ha}^{-1} \text{ yr}^{-1}$$

See CL 11.

Calculation of Changes in Litter Carbon:

A detailed description is provided in the PD. The PP applied the “Tool for estimation of carbon stocks and change in carbon stocks in dead wood and litter in due A/R CDM project activities”

Version 03. The PP used the “Default Factor” based methodology with following and therefore the following equation was applied:

$$C_{LI,i,t} = C_{TREE,i,t} \times DF_{LI}$$

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The project area biome is tropical, with annual rainfall amounts in the 1,000 – 1,600 mm/yr range, resulting in a 1% default factor.

Quantification of leakage:

A detailed description is provided in the PD. The PP applied the “A/R Tool “Estimation of the increase in GHG emissions attributable to displacement of pre—project agricultural activities in the A/ R project activity.

$$LK_t = LK_{AGRIC,t}$$

There is no displacement of agricultural activities, crop cultivation and / or grazing activities, that should result in an increase in GHG emissions. Hence leakage is considered as 0

$$LK_t = 0$$

Quantification of leakage:

Leakage emissions are accounted as zero in compliance with section 6 of the AR-Tool 15 as no displacement of agricultural activities takes place.

This could be confirmed in the course of the field visit via interviews held with technical staff, plantation managers and community members^{/09/10/}.

Data and Parameters available at validation:

Following Data and Parameter available at validation have been described in the PD under section 5.1:

Description of Data / Parameter	Value applied	TÜV Nord assessment and justification
The total number of bamboo clumps by species that are planted	200,000	Data for ex ante calculation, Planting schedule ^{/04/}
Bambusa polymorpha	200,000	Confirmed via field visit ^{/09/} and planting schedule ^{/01/}
Bambusa textilis		

Allometric equation for the calculation of above ground biomass of Bambusa polymorpha, from measurements of culm diameter	2,183413* (BHD ^{1.276375})	Development of Species Specific Allometric Equations for Bambusa polymorpha / ^{25/}
Allometric equation for the calculation of above ground biomass of Bambusa textilis, from measurements of culm diameter	0.933277* (BHD ^{1.802318})	Development of Species Specific Allometric Equations for Bambusa textilis / ^{26/}
Litter Carbon	1% of the total bamboo biomass for each stratum	IPCC Guidelines, Tool for estimation of carbon stocks and change in carbon stocks in dead wood and litter in due A/R CDM project activities, Version 03.
Soil Organic Carbon (SOC)	0.8 tCO ₂ /ha/yr	IPCC guidelines (UNFCCC/CCNUCC 2010 a), which recommends that a value of 0.8 tCO ₂ can be used as a default value for the stock change per year.
The root to shoot ratio or the ratio of below to above ground biomass) applied to calculate the below ground biomass of sympodial bamboo species	1:0.25	Confirmed via Peer Reviewed Literature/ ^{28/}
Carbon fraction of bamboo biomass	0.47	IPCC default factor for woody biomass, conservative, Table 4.3 V4_04_Ch4_Forest_Land_IPCC LULUCF
Conversion of Carbon to Carbon Dioxide Equivalent	44/12	Standard conversion factor, IPCC
Two-sided Student's t-value, at infinite degrees of freedom, for 90% confidence level	1.645	Confirmed via data for ex ante calculation/ ^{03/29}
Estimated standard deviation of biomass stock in stratum i.	35%	Confirmed via data for ex ante calculation/ ^{03/29}
Acceptable margin of error (i.e. one-half the confidence interval) in estimation of the biomass stock within the project boundary	10%	Confirmed via data for ex ante calculation/ ^{03/29}

See CL 12

Estimated Net GHG Emission Removals by Year

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Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)
2023	0	2.281	0	2.281
2024	0	8.560	0	8.560
2025	0	18.845	0	18.845
2026	0	43.673	0	43.673
2027	0	91.725	0	91.725
2028	0	163.583	0	163.583
2029	0	297.685	0	297.685
2030	0	505.017	0	505.017
2031	0	742.768	0	742.768
2032	0	938.173	0	938.173
2033	0	1.012.872	0	1.012.872
2034	0	1.015.805	0	1.015.805
2035	0	1.018.738	0	1.018.738
2036	0	1.021.672	0	1.021.672
2037	0	1.024.605	0	1.024.605
2038	0	1.027.538	0	1.027.538
2039	0	1.030.472	0	1.030.472
2040	0	1.033.405	0	1.033.405
2041	0	1.036.338	0	1.036.338
2042	0	1.039.272	0	1.039.272
TOTAL				1.039.272

TÜV NORD JI/CDM CP assessed the calculations of baseline emissions and project emissions and the expected net GHG reductions and removals by sinks. Corresponding calculations were carried out based on calculation spreadsheets^{/03/} provided. Correctness of calculations can be confirmed as they were replicated by the audit team using the information provided. The values and estimates presented in the PD are considered reasonable based on the documentation reviewed, further references and the result of the interviews during the onsite visit.

Based on the information reviewed TÜV NORD JI/CDM CP can confirm that the sources used are correctly quoted and interpreted in the PD. All assumptions and data indicated in the PD, and all relevant sources were checked and confirmed.

In essence TÜV NORD JI/CDM CP can confirm that the methodology was correctly applied following the requirements. All values in the PD are considered reasonable in the context of the proposed VCS project activity. Data sources are quoted correctly. Hence, the calculation of baseline stocks and removals, leakage and the expected net anthropogenic GHG removals by sinks are considered correct.

3.3.7 Methodology Deviations

The PD includes a description of a methodology deviation in section 3.6. and more detailed in section 4.2. this connects to the use of the AR-TOOL 14, This only applies to selecting allometric equations for ex-post estimation of carbon stocks in woody biomass. As allometric equations for ex-ante estimation must be selected following Annex 1,6 of the AR-TOOL 14. The only applicable data existing is the data selected by the PP. None of the sources listed in the AR-TOOL 14 under Annex 1 point 6 were seen as adequate, as the Bamboo Project is the first of its kind concerning the planted species, provenance, technology and ecological conditions. Hence the PP used the process for developing an equation for ex-post calculation in line with the CDM AR-TOOL 17. This also states, that for ex ante estimation of aboveground tree biomass in project scenario any allometric equation can be used. So the PP used the species specific developed allometric equations for the ex-ante estimation^{/4/}. The outcome of these equations is compared with data from an article published in the BAMBOO JOURNAL, No. 29 March 2015/41/ that shows the identical value for 5 year old *Dendrocalamus asper* propagated by rhizome cutting in tC/ha as calculated by the PP /04/: 41 tC. However, number of clumps/ha and culms/clump differ. The audit team assessed the provided information and reference and confirms the realistic estimate of the developed equation in the context of the sparse availability of available data.

Concerning the methodology deviation the audit team concludes as follows:

- The deviation is permitted, as it connects to “criteria and procedures relating to monitoring or measurement set out in the methodology (i.e., deviations are permitted where they relate to data and parameters available at validation, data and parameters

monitored, or the monitoring plan)”

- The calculated data based on the equation develop seems realistic as described above and due to the non-availability of sound scientific data it rather results into the increased accuracy of data.
- It relates to ex ante-estimations and therefore the quantification of GHG emissions reductions or removals to issue VERs is not affected.

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Therefore, the audit team concludes that the deviation of the Methodology is accepted.

3.3.8 Monitoring Plan

The monitoring plan presented in the PD complies with the requirement of the applied methodology. The assessment team checked all parameters presented in the monitoring plan against the requirements of the VCS standard and the methodology. For the monitoring of carbon stock changes under the VCS the requirements and parameter list as per methodology were followed. Relevant parameters available at validation are listed in the PD and are considered valid by the audit team as all values are derived either from IPCC sources, or other well-regarded published literature. As described in the PD, site specific allometric equations were developed for the ex-ante calculation of above ground biomass of *Dendrocalamus asper* and *Bambusa textilis*. Details are provided under section 3.3.6 in this report. No errors or misrepresentations were detected in the review of these data and based on review of the calculations of the project proponent, no values are missing. All relevant parameters that need to be monitored for verification are listed in the PD as required by the methodology. QA/QC procedures described in the PD are plausible both for monitoring and for individual parameters to be monitored. Detailed procedures are described in the QA/QC SOP^{/49/} provided to the audit team during onsite visit.

See CL 13

The monitoring procedures including QA/QC procedures as defined in the PD were reviewed by the audit team on paper and through interviews with the relevant personnel; this information together with a physical inspection allows the audit team to confirm that the proposed monitoring plan is feasible within the project design^{/01/04/10/}. TÜV Nord concludes that the PP is able to implement the monitoring plan to report ex-post GHG net anthropogenic removals, which can also be verified.

3.4 Non-Permanence Risk Analysis

Internal Risks

Risk Factor	Risk Factor and/or Mitigation Description	Risk Rating
a)	Not applicable. No GHG credits have previously been issues. Both species were identified in 2017 by the Government of Rwanda as being suitable and as priority species for the country ^{/12/} .	0 is accepted
b)	Not applicable. No GHG credits have previously been issues. No significant encroachment of outside actors.	0 is accepted
c)	EcoPlanet Bamboo's team covers individuals with extensive (>10 years' experience) in all aspects required for the successful implementation of this project ^{/09/10/15/}	0 is accepted
d)	EcoPlanet Bamboo has a full-time management team located in Rwanda within a 1–2-hour drive from the project areas ^{/09/10/} .	0 is accepted
e)	EcoPlanet Bamboo's Chief Operating Officer, Camille Rebelo has more than a decade of experience in the design, implementation, management, and successful deliverable of AFOLU carbon projects, under both the VCS and CDM ^{/09/10}	-2 is accepted
f)	EcoPlanet Bamboo employs a companywide policy on adaptive management ^{/09/10/18}	-2 is accepted
Total Project Management (PM) [as applicable, (a + b + c + d + e + f)] Total may be less than zero.		-4 is accepted

Financial Viability		
Risk Factor	Risk Factor and/or Mitigation Description	Risk Rating
a)	Not applicable.	0 is accepted
b)	Not applicable.	0 is accepted
c)	Not applicable.	0 is accepted
d)	The project is a carbon financed activity, with a forward purchase of the future carbon removal benefits being used to implement the project	0 is accepted

	activity. There are no expected returns from the project, and 100% of the funding needs have been secured ^{/32/} .	
e)	Not applicable.	0 is accepted
f)	Not applicable.	0 is accepted
g)	Not applicable.	0 is accepted
h)	The project proponent has secured 100% of the funds necessary to cover the total cash out before the project breaks even. The commitment in the form of a “VER Purchase Agreement, Rwanda Riparian Restoration Project, March 19th, 2022 (confidential)” had been verified during onsite visit ^{/32/} .	0 is accepted
i)	The project has committed funds for the scale of planting detailed in the validation report as evidenced by the commitment in the form of a “VER Purchase Agreement, Rwanda Riparian Restoration Project, March 19th, 2022 (confidential)” had been verified during onsite visit ^{/32/} .	-2 is accepted
Total Financial Viability (FV) [as applicable, ((a, b, c or d) + (e, f, g or h) + i)]		0 is accepted
Total may not be less than zero.		

Opportunity Cost		
Risk Factor	Risk Factor and/or Mitigation Description	Risk Rating
a)	Not applicable.	0 is accepted
b)	Not applicable.	0 is accepted
c)	Not applicable.	0 is accepted
d)	The project does not have an NPV, as 100% of the carbon financing received by the project proponent is being used for the implementation of project activities, the subsequent monitoring, and the cost of registration of the project under Verra. These terms are included within the confidential VER Purchase Agreement ^{/32/} .	0 is accepted

e)	Not applicable.	0 is accepted
f)	Not applicable.	0 is accepted
g)	Not applicable.	0 is accepted
h)	Mitigation: All project activities are occurring on land that is legally defined as riparian buffer zones as per Ministerial Order No. 07/16.01 of 15/07/2010, as being public property, or designated State Land, whose use can only be authorized by the Minister in charge of the Environment. Once reforested with bamboo, such lands remain under protection.	-2 is accepted
i)	Not applicable.	0 is accepted
Total Opportunity Cost (OC) [as applicable, (a, b, c, d, e or f) + (g + h or i)] Total may be less than 0.		-2 is accepted

Project Longevity		
a)	Not applicable	0 is accepted
b)	<p>The project is occurring on lands legally designated as riparian buffer zones, which are legally protected. No activities other than the approved reforestation activity and subsequent protection can occur on these lands. A legal framework is in place to ensure that once reforested, these riparian buffer zones are protected.</p> <p>Furthermore, the project longevity is assumed with 60 years. This is in accordance with the (conservative) assumption of the minimum lifetime of the bamboo species planted.</p> <p>The following external information have been checked for verification of the Lifetime of the planted species:</p> <ol style="list-style-type: none"> 1. Bambusa textilis has a productive lifecycle of upwards of 60 years https://www.researchgate.net/publication/348325755) 2. Bambusa polymorpha (The life cycle of this species is estimated at 60 years) 	0 is accepted

	https://tropical.theferns.info/viewtropical.php?id=Bambusa+polymorpha	
Total Project Longevity (PL) May not be less than zero		0 is accepted

Internal Risk		
Total Internal Risk (PM + FV + OC + PL) Total may not be less than zero.		0 is accepted

External Risks

Land Tenure and Resource Access/Impacts		
Risk Factor	Risk Factor and/or Mitigation Description	Risk Rating
a)	Not applicable.	0 is accepted
b)	The land is government owned, and the project proponent holds a long-term agreement to the management of and an additional agreement for the carbon benefits. This had been confirmed during field visit, interviews ^{09/10/} and document review ^{/05/06/} .	2 is accepted
c)	During document review, field visit and interviews no information on existing disputes over land tenure and ownership were observed ^{/09/10/} .	0 is accepted
d)	During document review, field visit and interviews no information on existing disputes over access use rights or overlapping rights were observed ^{/09/10/} .	0 is accepted
e)	Not a WCR project, therefore not applicable.	0 is accepted
f)	<p>The project area is protected under Ministerial Order No. 007/16.01 of 15/07/2010. It is further protected under law No. 48/2018 of 13/08/2018. This law determines that such lands are “reserved as natural vegetation. Artificial vegetation can be grown on this land in the case of restoring that land, or if that vegetation is responsible for protecting the environment by stopping soil erosion or being habitats for living organisms.</p> <p>Once planted, such riparian lands are therefore mandated by law to be protected and maintained. This had been confirmed during field visit, interviews ^{09/10/} and document review^{/08/22/}.</p>	-2 is accepted

g)	Not applicable.	0 is accepted
Total Land Tenure (LT) [as applicable, ((a or b) + c + d + e + f + g)]		0 is accepted
Total may not be less than zero.		

Community Engagement		
Risk Factor	Risk Factor and/or Mitigation Description	Risk Rating
a)	The risk factor does not apply, as there are no households reliant to the project areas. Respective information has been provided and verified by the audit team by document review, field visit and interviews ^{/09/10/} .	0 is accepted
b)	The risk factor does not apply, as there are no households reliant to the project areas. Respective information has been provided and verified by the audit team by document review, field visit and interviews ^{/09/10/} .	0 is accepted
c)	Not applicable.	0 is accepted
Total Community Engagement (CE) [where applicable, (a + b + c)]		0 is accepted
Total may be less than zero.		

Political Risk		
Risk Factor	Risk Factor and/or Mitigation Description	Risk Rating
a)	Not applicable.	0 is accepted
b)	Not applicable.	0 is accepted
c)	Not applicable.	0 is accepted
d)	The governance score is calculated correctly with - 0.08 ^{/30/33/}	2 is accepted
e)	Not applicable.	0 is accepted
f)	Not applicable.	0 is accepted
Total Political (PC) [as applicable ((a, b, c, d or e) + f)]		2 is accepted

Total may not be less than zero.	
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External Risk

Total External Risk (LT + CE + PC)	2 is
Total may not be less than zero.	accepted

Natural Risks

Natural Risk: Fire

Significance	<p>All areas undergoing reforestation activities are riparian buffer zones, thereby are inherently protected by fire due to their proximity to water.</p> <p>Furthermore, the use of fire in Rwanda as a land preparation activity that might spread uncontrolled is strictly prohibited by law, and therefore its occurrence extremely unlikely.</p> <p>The verification team confirms the general resistance of bamboo against fire.</p> <p>This is confirmed by the audit team via adequate scientific literature ^{/23/}, field visit and interviews^{/09/10/}.</p>
Likelihood	<p>The likelihood of fire occurring either within or adjacent to the project boundary can be conservatively determined to be:</p> <p>Every 50 to less than 100 years</p>
Score (LS)	0 is acceptable
Mitigation	Not applicable or required

Natural Risk: Pest and Disease

Significance	<p>The audit team confirms the high resistance of bamboo against pests and diseases. The incidents described do not cause measurable loss of biomass and therefore the carbon content of the bamboo.</p> <p>Furthermore, an increased mortality rate of the seedlings would result either in replanting or in not reporting such clumps at monitoring.</p> <p>The audit team considers the significance as “No Loss” of carbon and therefore as 0.</p>
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Likelihood	The audit team concludes that the likelihood of and pest and disease event (herbivores and chicken) is according to the field observations /09/10/ “less than every 10 years”.
Score (LS)	0 is acceptable
Mitigation	Not applicable

Natural Risk: Extreme Weather

Significance	<p>Bamboo is known to be extremely resistant to extreme weather. The project proponent has experience of this firsthand from planted bamboo in other projects, that has withstood three hurricanes with no loss. However, extreme weather events could result in the flooding of the water resources against which the bamboo is being planted as riparian buffer zones. While the bamboo will withstand short term flooding, any longer-term flooding or residual standing water in lower lying patches of the project areas represents a threat to the survival of the clumps, particularly in the early years of development.</p> <p>Therefore, audit team confirms the significance of extreme weather as “Minor (5% to less than 25% of carbon stocks)”, considering information from document review, interviews with farmers and experts and site visits/09/10/.</p>
Likelihood	<p>The project area is located in a geographic area where flooding is not common, however this might change due to global climate change. Furthermore, the project covers a wide geographic area with significant variation in landscapes.</p> <p>Therefore, the audit team confirms the likelihood of this risk as estimated “Every 10 to less than 25 years.”.</p>
Score (LS)	2 is acceptable
Mitigation	<p>The project activities in of themselves are an inherent mitigation measure against flooding and any other extreme weather. The underground rhizome structure, combined with the dense canopy serves as a natural barrier during heavy rainfall events, reducing the flow of water into the neighboring water resources. The mitigation measures as described were verified by the audit team during the field visit/09/10/.</p> <p>Mitigation rating of 0.5 is accepted, with no effect on the calculation.</p>

Natural Risk: Geological Risks

Significance	Transient – all carbon stocks would be expected to fully recover within 10 years of any event.
Likelihood	No relevant geological risks are reported in the project area. Risk is not applicable to the project areas.
Score (LS)	0 is acceptable
Mitigation	Not applicable as no risk expected

Natural Risk: Other Risks

Significance	No other natural risks to the project activities and associated carbon removals are anticipated. This is confirmed by the audit team. No other risks are known ^{9/10/} .
Likelihood	Not applicable
Score (LS)	0 is acceptable
Mitigation	Not applicable

Score for each natural risk applicable to the project (Determined by (LS × M))

Fire (F)	0
Pest and Disease Outbreaks (PD)	0
Extreme Weather (W)	1
Geological Risk (G)	0
Other natural risk (ON)	0
Total Natural Risk (as applicable, F + PD + W + G + ON)	1

Overall Risk Rating

Risk Category	Rating
Internal Risk	0
External Risk	2
Natural Risk	1
Overall Risk Rating (a + b + c)	10

See CL 14

The non-permanence risk deduction to be applied for the project is calculated with 3%.

According to the tool the minimum risk rating shall be 10%, regardless of the risk rating calculated.

TÜV Nord has checked that information provided in the Non-Permanence Risk Report is consistent with the support documents provided. TÜV Nord deems that information provided is reliable and appropriate. Thus, the audit team concludes that the applied risk score of 10% is adequate for the project activity.

In this context CL 9 has been opened and were successfully closed/^{APPENDIX}.

4 VALIDATION CONCLUSION

Ecoplanet Bamboo Ltd. has commissioned the TÜV NORD JI / CDM Certification Program to carry out the verification of the Project:

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“Rwanda Riparian Restoration Project”

in Rwanda with regard to the requirements of VCS 4.3 Standard. The AFOLU grouped project involves the reforestation with bamboo; thus, GHG are removed.

In the course of this validation one (1) Corrective Action Requests (CARs) and 14 Clarification Requests (CLs) were raised and successfully closed. Two (2) Forward Action Request (FAR) was raised for consideration at verification.

The validation is based on project design documentation, the non-permanence risk assessment, the ex - ante carbon calculation spreadsheet and additional documents related to baseline and monitoring methodology. Subsequent background investigation, field visits, follow-up interviews and review of comments have provided TÜV-Nord with sufficient evidence to validate the fulfilment of the stated criteria.

In detail TÜV NORD confirms:

- The project is in line with all criteria of the VCS Standard v4.3.
- The project additionality is sufficiently justified in the PD.
- The Monitoring Plan is transparent and adequate.
- The analysis of the baseline emission, project emissions and leakage has been carried out in a transparent and conservative manner, so that the calculated number of total ERs of 1.039.272 correlating with a long-term average GHG benefits of 653,651 tCO₂e is most likely to be achieved within the 20 years crediting period from 01-October 2022 to 30-September-2042.

Augsburg, 15. September 2023



Martin Seitz

Validation Leader

JI/CDM Certification Program

Hannover, 15. September 2023



Alexandra Nuske

Final Approver

JI/CDM Certification Program

APPENDIX I: LIST OF FINDINGS

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Finding:	CAR 01		
Classification	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR
<p>Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i></p>	<p><u>Editorial aspects of the PDD:</u></p> <ol style="list-style-type: none"> 1. Consider the findings of the CARs and CLs and update PDD, NPRR and carbon calculations accordingly. 2. 1.3 m for DBH in all sections 3. Reverence to VCS STD v4.3 4. Section 1.6 of the template: Include only entities “involved in the development of the project” 5. Section 1.11: Change “privately held land” 6. Check the numbering of the PD in line with the template; section Project Boundary is 3.3, Baseline scenario is 3.4, Additionality is 3.5 etc. 7. Include the numbers of equations as determined in the methodology. <p><u>Supporting documents to be provided:</u></p> <ol style="list-style-type: none"> 1. Legal document that “EcoPlanet Rwanda LLC” is wholly owned subsidiary of the project proponent, EcoPlanet Bamboo Group, LLC. 2. Adaptive Management Plan 		
<p>Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i></p>	<p>The following actions have been undertaken:</p> <ol style="list-style-type: none"> 1. All CARs and CLs have been addressed, with the Project Document, Carbon Calculation Spreadsheets and the Non Permanence Risk Assessment updated accordingly. The versions of all documents and the dates of issue have been updated. 2. DBH has been corrected to be 1.3 m in all sections 3. All references to the VCS standard have been updated to refer to v4.3 4. Section 1.6 has been updated to clarify that the project proponent is also the implementing entity, and there are no other entities involved in the development of the project. 5. Section 1.11 has been corrected to remove “privately held land” 6. The numbering in Section 3 has been corrected. 7. The numbers of each equation as determined by the methodology and/or appropriate tool have been updated. <p><u>The following documents have been provided:</u></p>		

Finding:	CAR 01
	<ol style="list-style-type: none"> 1. Company organization chart and operating agreements showing that EcoPlanet Bamboo Rwanda Ltd is wholly owned subsidiary of the project proponent, EcoPlanet Bamboo Group, LLC. 2. Adaptive Management Plan
<p>DOE Assessment #1</p> <p><i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i></p>	<ol style="list-style-type: none"> 1. All CARs and CLs have been addressed and versions of all documents and the dates of issue have been updated. 2. DBH has been adapted to 1.3 in PD 5.2, box 3. STD has been adapted to 4.3 in PD on page: 5, 12, 33 4. Section 1.6 has been adapted 5. Section 1.11 has been corrected 6. The numbering of the PD is now in line with the template; section Project Boundary is 3.3, Baseline scenario is 3.4, Additionality is 3.5 etc. 7. The numbers of equations as determined in the methodology have been included. <p>Requested documents have been provided /13/14/</p>
<p>Conclusion</p> <p><i>Tick the appropriate checkbox</i></p>	<ul style="list-style-type: none"> <input type="checkbox"/> To be checked during the next periodic verification <input checked="" type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> Project documentation was corrected correspondingly <input type="checkbox"/> Additional action should be taken <input checked="" type="checkbox"/> The project complies with the requirements

Finding:	CL 01		
Classification	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	PDD 1.1 Project description: Provide further information in the PD concerning the location of the project in the context of the first instance and the area for the grouped project and on ownership of the buffer strips.		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The PP has added the following additional details: <ul style="list-style-type: none"> • Identification of the districts in which the 1st project location occurs. • Highlighting of the boundaries of Rwanda as the boundary for the grouped project. • Statement on the ownership and management of the riparian buffer zones. 		
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Further detailed information concerning the location of the project has been included in section 1.1		
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> Project documentation was corrected correspondingly <input type="checkbox"/> Additional action should be taken <input checked="" type="checkbox"/> The project complies with the requirements		

Finding:	CL 02		
Classification	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	<p>1.2 Sectoral scope and project type.</p> <p>Provide clarification on the specific type (Afforestation/Reforestation/Revegetation) of the ARR project in line with VCS “Program Definitions” and include the number for the scope (14). Assure consistency in all sections of the PD.</p>		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	<p>The following has been undertaken:</p> <ul style="list-style-type: none"> • Section 1.2 has been updated • Scope 14 has been added • Reforestation has been changed to revegetation throughout the PD. 		
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	<p>Respective information has been included. Clarification has been provided that a project meets the definition of a re-vegetation project rather than afforestation.</p>		
	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> Project documentation was corrected correspondingly <input type="checkbox"/> Additional action should be taken <input checked="" type="checkbox"/> The project complies with the requirements		

Finding:	CL 03		
Classification	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR
Description of finding <small>Describe the finding in unambiguous style; address the context (e.g. section)</small>	1.11: Description of the Project Activity 1. Update statement on jurisdictional REDD+ 2. Include additional information on other entities, organizations and communities involved in section 1.11 instead of 1.06 and 1.12		
Corrective Action #1 <small>This section shall be filled by the PP. It shall address the corrective action taken in details.</small>	The following actions have been undertaken: 1. Section 1.11 has been corrected to highlight that the project activity does not include any land areas covered by a jurisdictional REDD+ program. 2. Section 1.06 and 1.12 have been updated to include only the project proponent, as the project proponent is also the implementing partner, and there are no other entities, organizations or communities involved in development of the project.		
DOE Assessment #1 <small>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</small>	Respective sections of the PD have been updated. Further clarification has been provided that's the Land areas are not covered by jurisdictional REDD+ program. The sections concerning other entities involved are updated clarified.		
Conclusion <small>Tick the appropriate checkbox</small>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> Project documentation was corrected correspondingly <input type="checkbox"/> Additional action should be taken <input checked="" type="checkbox"/> The project complies with the requirements		

Finding:	Validation Report: VCS Version 4.1 CL 04		
Classification	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	PDD 1.12, Project location: Include in this section all information as stated in the VCS STD v 4.3 under 3.10.2		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The following information has been included or expanded upon in section 1.12: <ul style="list-style-type: none"> • Name of the project area – as well as reference to monitoring and details of how each planted area will be categorized upon planting. • Maps of project area and KML file for 1st project instance • Total size of the project area • Details of ownership. 		
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Additional information has been provided in Section 1.12. At present there is a detailed description and map showing the potential planting area alongside the different rivers (1 st instance). This has been provided by the state authority RWB. KLM files ^{/03/} are available showing a unique identifier for each river. As planting is done alongside these rivers only in a single row and carbon-calculation is finally based on the number of planted clumps, the actual area is not necessarily required. Final shape files will be provided at verification. At that time also small patches of non plantable sections are finally excluded (existing trees, rocky areas, ...). Transformed in FAR 2		
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> Project documentation was corrected correspondingly <input type="checkbox"/> Additional action should be taken <input checked="" type="checkbox"/> The project complies with the requirements		

Finding:	Validation Report: VCS Version 4.1 CL 05		
Classification	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	PDD 1.18: Commercially sensitive information: Include information on documents with “commercially sensitive information”, which were made available to the Audit team but not to the public.		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	Section 1.18 of the PD has been updated accordingly.		
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The section has been updated.		
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> Project documentation was corrected correspondingly <input type="checkbox"/> Additional action should be taken <input checked="" type="checkbox"/> The project complies with the requirements		

Finding:	CL 06		
Classification	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	<p>PDD 3.1/3.2:</p> <p>Assure that all tools applicable to the methodology or applied in addition are listed in the PDD section 3.1/3.2:</p> <p>Following tool is not listed:</p> <ul style="list-style-type: none"> - Estimation of non-CO2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity. - Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity”. <p>Include information of all sources and gases in the tables of the Project Carbon Pools in the PDD (table 3) in line with the methodology.</p> <p style="text-align: center;">For AFOLU projects, include in the diagram or map the locations of where the various measures are taking place, any reference areas and leakage belts.</p>		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	<p>The PP has updated section 3.1 to include the following relevant tools:</p> <ul style="list-style-type: none"> - Estimation of non-CO2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity. - Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity”. <p>The tables in Section 3.2 have been updated.</p> <p>An additional map has been included in Section 3.2 to highlight the locations where the project activities are taking place. There are no reference areas or leakage belts relevant to the proposed project activity.</p>		
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	<p>Section 3.1 has been updated and missing tools included. The additional map is provided in section 3.3.</p>		
Conclusion <i>Tick the appropriate checkbox</i>	<p><input type="checkbox"/> To be checked during the next periodic verification</p> <p><input type="checkbox"/> Appropriate action was taken</p> <p><input checked="" type="checkbox"/> Project documentation was corrected correspondingly</p>		

Finding:	CL 06
	<input type="checkbox"/> Additional action should be taken <input checked="" type="checkbox"/> The project complies with the requirements

Validation Report: VCS Version 4.1

Finding:	CL 07		
Classification	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	<p>PDD Project Boundary (3.3):</p> <p>Include information of all sources and gases in the tables of the Project Carbon Pools in the PDD (table 3) in line with the methodology.</p> <p>In addition to the table, provide a diagram or map of the project boundary, showing clearly the physical locations of the various installations or management activities taking place as part of the project activity based on the description provided in Section Fehler! Verweisquelle konnte nicht gefunden werden. (Description of the Project Activity) above. Include in the diagram or map the locations of where the various measures are taking place... or refer to the information provided in section 1.12.</p>		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	<p>The first part of CL08 is identical to CL06 and CL 07 and has already been addressed.</p> <p>Section 3.3 has been updated with the reference to the information provided in Section 1.12 and the map of the project area of the 1st project instance.</p>		
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	<p>Section 3.3 of the PD has been updated. All carbon pools are described. A map has been included.</p>		
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> Project documentation was corrected correspondingly <input type="checkbox"/> Additional action should be taken <input checked="" type="checkbox"/> The project complies with the requirements		

Finding:	CL 08		
Classification	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR
Description of finding <small>Describe the finding in unambiguous style; address the context (e.g. section)</small>	PDD 3.5: Step 4 of the tool is not included in the PDD. The tool requires as step 4 a common practice analysis.		
Corrective Action #1 <small>This section shall be filled by the PP. It shall address the corrective action taken in details.</small>	The PP has updated Section 3.5, Step 4 to include a common practice analysis.		
DOE Assessment #1 <small>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</small>	A common practise analysis has been included under section 3.5.		
Conclusion <small>Tick the appropriate checkbox</small>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> Project documentation was corrected correspondingly <input type="checkbox"/> Additional action should be taken <input checked="" type="checkbox"/> The project complies with the requirements		

Finding:	CL 09		
Classification	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR
Description of finding <small>Describe the finding in unambiguous style; address the context (e.g. section)</small>	4.1: Include the complete Equation 1 according to the Methodology (including Dead Wood)		
Corrective Action #1 <small>This section shall be filled by the PP. It shall address the corrective action taken in details.</small>	Equation 1 has been corrected to include dead wood.		
DOE Assessment #1 <small>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</small>	Equation 1 has been updated and deadwood include.		
Conclusion <small>Tick the appropriate checkbox</small>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> Project documentation was corrected correspondingly <input type="checkbox"/> Additional action should be taken <input checked="" type="checkbox"/> The project complies with the requirements		

Finding:	CL 10		
Classification	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	PDD 4.2: Dendrometric Variables, Page 61 In the PDD it is mentioned, that the “the data on the projected growth of the clumps of the two species being grown comes from two sources:” In the text only one source is explained. Include the second source.		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The second source was already in the text but the PP has updated this section to separate it out and make clearer the two sources of data.		
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Section 4.2 has been updated and both sources included list up		
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> Project documentation was corrected correspondingly <input type="checkbox"/> Additional action should be taken <input checked="" type="checkbox"/> The project complies with the requirements		

Finding:	CL 11		
Classification	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	<p>PDD 4.2:</p> <p>Calculation of Changes in Soil Organic Carbon:</p> <ol style="list-style-type: none"> 1. Provide explanation and evidence of the soil type selected 2. Provide explanation and evidence on the “relative stock change factors” and the applied default value of 0.7 3. Provide the calculation of the changes in SOC in the PDD or via the applicable Excel “CDM SOC tool” <p>Calculation of Changes in Litter Carbon:</p> <p>The conservative default factor for expressing carbon stock in litter as a percentage of carbon stock in bamboo biomass is 1%. Provide consistence in the following section of the PDD and in the Carbon calculation.</p>		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	<p>The previous calculation of change in SOC was wrong. The PP has now updated it along with corrected relative stock change factors and supporting information for the reference soil.</p> <p>The calculations have been included in the PD.</p> <p>The text referring to the calculation of litter carbon has been corrected to be 1%. No updates to the carbon calculations were necessary as they already use the 1%.</p>		
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	<p>Calculation of SOC has been included.</p> <p>Input parameters for the project area are correctly described as:</p> <p>Climatic region: tropical montane, (not tropical wet as calculated with)</p> <p>Soil type: LAC</p> <p>SOC stock value for the project area should be calculated with 63 instead of 60.</p> <p>As the maximum annual sequestration allowable is 0,8 tC/ha/year there are no changes in the carbon calculations.</p> <p>Values in the PD need to be adapted accordingly.</p>		
Corrective Action #2 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	<p>The PD was updated to reflect the climate region as tropical montane.</p> <p>The SOC reference value was updated to be 63 and the equations updated accordingly. This resulted in a higher annual sequestration of</p>		

Finding:	CL 11
	>0.9, and therefore no changes were made to the calculations given they already used the maximum annual sequestration of 0.8.
DOE Assessment #2 <i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Respective changes have been made in the PD. No changes required in the carbon calculation.
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> Project documentation was corrected correspondingly <input type="checkbox"/> Additional action should be taken <input checked="" type="checkbox"/> The project complies with the requirements

C	CL 12		
Classification	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	PDD 5.1: Data and Parameters Available at Validation Clarify on the following Data and Parameters: <ol style="list-style-type: none"> 1. $ABG_{CULM_POLYMORPHA} = 2,183413 \times D^{1.276375}$ (according to Camargo Bambusa polyporpha/^{25/}) 2. $ABG_{CULM_Textilis} = 0,933722 \times D^{1.802318}$ (according to Camargo Bambusa textilis/^{26/}) 3. Percentage value of the Litter Carbon (1%) 4. RS: 1.0.25? 5. Default value of CF 		

C	CL 12
<p>Corrective Action #1</p> <p><i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i></p>	<p>The following actions have been undertaken:</p> <ol style="list-style-type: none"> 1. The equations for the two species were the wrong way around. They have been corrected. 2. As above. 3. Corrected. 4. Corrected to 1:0.25 5. Corrected to 0.5
<p>DOE Assessment #1</p> <p><i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i></p>	<p>Respective changes have been made in the PD.</p> <ol style="list-style-type: none"> 1. Adapted 2. $ABG_CULM_Textilis = 0,933722 \times D^{1.802318}$ (according to Camargo Bambusa textilis^{26/}) The value is correct in the calculation but wrongly stated in the PD with $0,933722 \times D^{1.702318}$ instead of $0,933722 \times D^{1.802318}$ 3. Adapted 4. Adapted 5. Default value of CF set to 0.5; There are different values in Table 4.3 V4_04_Ch4_Forest_Land_IPCC LULUCF Provide explanation for the conservative application of value 0.5 6. The carbon calculation is generally correct, but wrongly transferred into the PD. There are also some editorial changes required (marked in the yellow) Estimated net GHG emission reductions or removals (tCO₂e): 1,039,272, Average annual ERs: 51,964
<p>Corrective Action #2</p> <p><i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i></p>	<p>The PP has addressed the above findings as follows:</p> <ol style="list-style-type: none"> 1. No update needed 2. The equation was corrected in the PD to be $0.933722 \times D^{1.802318}$ 3. No update needed 4. No update needed 5. Updated to reflect 0.47 and all calculations and PD updated accordingly 6. The calculation spreadsheets have been corrected and all relevant tables and the total estimated GHG emission reductions have been updated throughout the PD.
<p>DOE Assessment #2</p>	<ol style="list-style-type: none"> 1. n.a

C	CL 12
<p>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</p>	<p>2. The equation was corrected in the PD to be $0.933722 \times D^{1.802318}$</p> <p>3. n.a</p> <p>4. n.a</p> <p>5. The default factor of 0.47 from the IPCC guidelines has been used in line with IPCC values in Table 4.3 V4_04_Ch4_Forest_Land_IPCC LULUCF, PD and calculations have been adapted accordingly</p> <p>6. The audit team confirms the adaptation of the calculation spreadsheets. All relevant tables and the total estimated GHG emission reductions have been updated throughout the PD.</p>
<p>Conclusion Tick the appropriate checkbox</p>	<p><input type="checkbox"/> To be checked during the next periodic verification</p> <p><input type="checkbox"/> Appropriate action was taken</p> <p><input checked="" type="checkbox"/> Project documentation was corrected correspondingly</p> <p><input type="checkbox"/> Additional action should be taken</p> <p><input checked="" type="checkbox"/> The project complies with the requirements</p>

C	CL 13		
Classification	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	PDD 5.1: Data and Parameters Monitored Clarify on the following Data and Parameters: 1. N _{Clump_SPECIES_T} : as source of date it is mentioned “Estimation”. An estimation cannot be the database for the ex post carbon calculation.		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	This CL refers to 5.2 not 5.1. This parameter has been corrected to “Project Records”.		
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Respective changes have been made in the PD		
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> Project documentation was corrected correspondingly <input type="checkbox"/> Additional action should be taken <input checked="" type="checkbox"/> The project complies with the requirements		

Finding:	CL 14		
Classification	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	<p>Non-Permanence Risk Report: Include sources to statements made in the report and provide the respective documents. Include evidence for the following requirements:</p> <ol style="list-style-type: none"> 1. Project Management: 2.2.1 3) Evidence that species planted are adapted to the same or similar agro-ecological zone(s) in which the project is located may be demonstrated through: publications in scientific journals; technical reports from government agencies, NGOs or research groups; or, successful use over time by other projects registered under the VCS Program or an approved GHG program. 2. Project Management: f. Mitigation: Adaptive management plan in place. 3. Opportunity Cost: Provide further clarification on the selected Risk-Factor: If it is un-used land, it is rather e) than d). 4. Project Longevity: The entire project longevity shall be covered by management and financial plans as submitted to local government or financial institutions, or otherwise made public, in which the intention to continue management practices is stated and planned for, and may include external evidence such as municipal land-use plans, institutional structures, or tools such as ecological-economic zoning. Min 30 years. 5. Provide the calculation of the governance score for Rwanda 		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	<p>The Non Permanence Risk Assessment has been updated as follows:</p> <ol style="list-style-type: none"> 1. The PP has updated this section with an expanded explanation of the species suitability, following the VCS requirements. In addition, a number of peer reviewed publications, as well as a government report highlighting the suitability of these species for the agro-ecological zone in which the project is operating, have been provided. 2. EcoPlanet's adaptive management plan has been provided. 3. The PP does not believe that this is a valid CL. Opportunity Cost (e) refers to "NPV from project activities is expected to be between 20% and 50% more profitable than the most profitable alternative land use activity". This is not relevant to the project, given that there are no returns associated with the project. Carbon financing is used solely for the implementation of the project activities, which are being carried out purely for their high impact. As per the VERPA shown to the VVB, it is required that - with the exception of the project proponent's corporate management, auditing and Verra's costs, all carbon financing is to be used in country, either directly for the project activities, and monitoring costs, or if there is excess, for indirect sustainable development activities. Therefore, there is no NPV associated with the project, nor any profitability. At the same time, as 		

Finding:	CL 14
	<p>seen during the audit, the only activity that might be occurring is clearly for subsistence, representing illegal use by surrounding farmers. Therefore, the PP believes that factor d is correct and has only expanded on this with reference to the above use of funds.</p> <ol style="list-style-type: none"> 4. Copies of the laws that define the management of Rwanda's riparian buffer zones have been uploaded to the dropbox folders shared with the VVB. Such laws show a clear commitment to the maintenance and protection of these buffer zones, with a legal framework requiring such protection. Such legalities are not bound by a timeframe and therefore extend indefinitely. 5. A spreadsheet with the governance calculation for Rwanda has been provided.
<p>DOE Assessment #1</p> <p><i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i></p>	<p>The assessment is based on the following document: Rwanda Riparian Restoration Project Non Permanence Risk Report v1.1 19.08.22</p> <ol style="list-style-type: none"> 1. Respective information has been included in the report. 2. Adaptive management plan has been provided/^{18/} 3. The audit team follows the argumentation provided by the PP. In addition, the selection of d) (O) is conservative compared to e) (-2) 4. Respective evidence/Laws to proof the legal agreements to continue the management has been provided. 5. The value calculated by the PP for the years 2016 – 2020: -0.01 (at that time the data for 2021 was not available) The recalculated value for the years 2017 – 2021 is: -0,08 The score according to the tool is still the same: 2 The report has been updated.
<p>Conclusion</p> <p><i>Tick the appropriate checkbox</i></p>	<ul style="list-style-type: none"> <input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> Project documentation was corrected correspondingly <input type="checkbox"/> Additional action should be taken <input checked="" type="checkbox"/> The project complies with the requirements

Finding:	FAR 01		
Classification	<input type="checkbox"/> CAR	<input type="checkbox"/> CL	<input checked="" type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	<p style="text-align: center; font-size: small;">Validation Report: VCS Version 4.1</p> <p>The PP uses the following system of calculation of the area planted:</p> <p>The PP intends to plant 400.000 bamboo seedlings on 1000 ha. The calculated space of each planted Bamboo clump is 20 m² (4m x 5m spacing). This indicates that 500 plants are planted on 1 ha. Due to the circumstance that there are existing solitary trees, rocky areas, small groups of trees etc. where planting of seedlings is not executed, 1 ha will, in many cases, include rather less than the 500 plants.</p> <p>The calculation of the area planted will therefore be based on the number of clumps planted rather that on the actual area size. This means, that on the available area of above 1000 ha, a calculated area of 1000 ha will be planted. Hence, the base for the carbon inventory is rather the number of plants than the actual area.</p> <p>The PP uses a specific forestry software which is presently under development to document the exact number of clumps planted, its survival status etc.</p> <p>At verification the audit team will have to verify the actual number of existing clumps by a sampling approach. At validation there was no detailed description, how this will be achieved. The PP needs to bear in mind, that the inventory as base of the carbon calculation needs to be verifiable.</p>		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>			
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>			
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Appropriate action was taken <input type="checkbox"/> Project documentation was corrected correspondingly <input type="checkbox"/> Additional action should be taken <input type="checkbox"/> The project complies with the requirements		

Finding:	FAR 02		
Classification	<input type="checkbox"/> CAR	<input type="checkbox"/> CL	<input checked="" type="checkbox"/> FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	<p>The PP has not yet completely defined the final project area, which will be used for the planting of the bamboo and for the carbon calculation. Hence, the final shapefile of the project area (only eligible areas) has not been provided yet.</p> <p>The following information is provided and confirmed by the audit team (as described in CL 04):</p> <ul style="list-style-type: none"> - The PP has an agreement to plant 400,000 plants on 1,000 ha /05/06/. - The respective shapefile for the potential area is provided by the governmental authority Rwanda Water Board/^{03/} - The potential eligible project area is much bigger than the 1000 ha /01/ <p>A shapefile showing all potentially eligible planting areas is provided/^{03/}. There is little, if any, native vegetation or ecosystems left within the project area (2012 – 2022)/^{01/09/10/19/}. Other non-eligible planting areas like roads, settlements, farms and other infrastructure are obvious and recognisable in these maps. Additional information has been provided as planting polygons/^{03a/}.</p> <p>Hence, the audit team concludes, that it is sufficient to provide the shapefile for the final project area eligible for carbon calculation /issuance of VERs at the 1. Verification certification.</p>		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>			
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>			
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the next periodic verification <input type="checkbox"/> Appropriate action was taken <input type="checkbox"/> Project documentation was corrected correspondingly <input type="checkbox"/> Additional action should be taken <input type="checkbox"/> The project complies with the requirements		

TR Description of finding: 18.11.2022

Corrective Action #1: 24.11.2022

DOE Assessment #1: 13.12.2022

Validation Report: VCS Version 4.1

Finding:		TR 01		
Classification	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR	
Description of finding				
Finding:		TR 02		
Classification	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR	
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	<p>1. 1.7: The description does not show that the authorization letter has been issued.</p> <p>2. 1.14: A conclusion whether the project complies with all laws is missing.</p> <p>3. 2.4: The public information about the national NDCs are provided to show that there are currently no other binding limits. See VCS STD Section 2.2.3. Evidence from the program operator, designated after project start date (see the relevant regulatory authority stating that the specific GHG emission reductions or removals generated by the project or type of project are not within the scope of the program or</p>			
Corrective Action #1 <i>This section shall be filled by the PP. It shall identify the corrective action taken in details. This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	<p>Section 2 of the PD has been updated as follows:</p> <ol style="list-style-type: none"> Section 2.4 has been updated with the dates of the public comment period, as well as a statement that no comments were received; Section 2.2 has been updated to reflect that stakeholder consultations has been completed now that the project has moved into implementation, including photographic evidence of the different levels of such consultations. Section 1.16.1 has been updated with a statement from the Letter of 			
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	<p>1. Generated by the project activities are the publicized with Rwanda's NDC information has been included in the PD.</p> <p>4. Section 1.17 has been updated with a section on monitoring of SDGs</p> <p>2. The PD has been updated to reflect the actual project implementation status.</p>			
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-2. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	<p>1. Information on Letter of authorization and MUO has been included in the PD.</p> <p>2. A conclusion that the project complies with all applicable laws is included in the PD.</p> <p>3. Appropriate action was taken</p> <p>4. Project documentation was corrected correspondingly</p> <p>Additional action should be taken</p> <p>Basic information on MRV has been included on the PD</p> <p>The project complies with the requirements</p>			
Conclusion <i>Tick the appropriate checkbox</i>	<p><input type="checkbox"/> To be checked during the next periodic verification</p> <p><input type="checkbox"/> Appropriate action was taken</p> <p><input checked="" type="checkbox"/> Project documentation was corrected correspondingly</p> <p><input type="checkbox"/> Additional action should be taken</p> <p><input type="checkbox"/> The project complies with the requirements</p>			

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APPENDIX II: ABBREVIATIONS

Abbreviations	Full texts
ARR	Afforestation, Reforestation and Revegetation
AFOLU	Agriculture, Forestry and Other Land Use
BAU	Business as usual
CAR	Corrective Action Request
CCB	Climate, Community & Biodiversity
CCBA	Climate, Community & Biodiversity Association
CDM	Clean Development Mechanism
CL	Clarification Request
CO2	Carbon dioxide
CO2e	Carbon dioxide equivalent
CP	Certification Program // Crediting Period
DNA	Designated National Authority
EB	CDM Executive Board
ER	Emission Reductions
ETS	Emission Trading Scheme
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GMO	Genetically modified organism
GS	Gold Standard
HCVs	High Conservation Values
IFM	Improved Forest Management
IPCC	Intergovernmental Panel on Climate Change
JNR	Jurisdictional and Nested REDD+
MP	Monitoring plan
MR	Monitoring Report

NDRC	National Development and Reform Commission
NPRA	Non-Permanence Risk Analysis
PD	Project Description
PP	Project Participant
PRA	Participatory Rural Appraisal
QC/QA	Quality control/Quality assurance
REDD	Reduced Emissions from Deforestation and Degradation
RWB	Rwanda Water Resource Board
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Verified Carbon Standard
VCSA	Verified Carbon Standard Association
VCU	Verified Carbon Unit
VER	Verified Emission Reduction
VVB	Validation/Verification Body

APPENDIX III: REFERENCES

Reference	Document
/01/	01_Rwanda Riparian Restoration Project PD, v1.3, 2.11.22
/02/	02_Rwanda Riparian Restoration Project Non-Permanence Risk Report v1.1 19.08.22
/03/	03_Rwanda Riparian Restoration Project Boundary
/04/	04_GHG Calculations Rwanda Riparian 02.11.22
/05/	05_MoU EcoPlanet - RWB 01.06.22
/06/	06_RWB Letter of Authorization
/07/	07_Rwanda_Water_Resources_Board_Strategic_Plan
/08/	08_Rwanda Ministerial Order No. 00716.01 of 15072010
/09/	09_Field Notes_2022
/10/	10_Attendance Register
/11/	11_Verra Findings 2928 - EcoPlanet Response
/12/	12_FINAL Bamboo Bio-Economy Feasibility Study Rwanda FINAL 17.10.17
/13/	13_EcoPlanet Bamboo EA, LLC - Operating Agreement 08.12.2021
/14/	14_EcoPlanet Bamboo Org Chart 05.24.22

Reference	Document
/15/	15_CV_Samantha Wilde CV
/16/	16_CV_JM HABANABAKIZE
/17/	17_CV_Rodney Mpame
/18/	18_EcoPlanet Adaptive Management Plan 2021
/19/	19_Forest_cover_report_2019
/20/	20_LETTER RWB_karongi,muhanga,Ruhango.
/21/	21_Waypoints_APR-22
/22/	22_Rwanda Law no. 272021 of 10062021
/23/	A Commentary on the Bamboos (Poaceae: Bambusoideae) Thomas R. Soderstrom and Cleofe E. Calderon, 1979.
/24/	24_Procedure 9. Complaints, Grievances, Disputes and Conflict Resolution
/25/	25_Camargo 03.2022 Allometric Equations for D.Asper
/26/	26_Camargo 03.2022 Allometric Equations for B.Textilis
/27/	27_VCS-Risk-Report-Calculation-Tool-v4.0_Rwanda_MS
/28/	28_Gurmessa et al

Reference	Document
/29/	EcoPlanet Bamboo Ghana plantations, data provided from 2015 – 2018 internal monitoring.
/30/	30_WB Governance Scores - Rwanda 2017-2021
/31/	31_Rwanda_Updated_NDC_May_2020
/32/	32_VER Purchase Agreement, Rwanda Riparian Restoration Project, March 19th, 2022 (confidential)
/33/	33_WB Governance Scores - Rwanda 2016-2020
/34/	https://www.greenclimate.fund/countries/rwanda
/35/	https://www.unredd.net/regions-and-countries/africa/rwanda.html
/36/	https://earth.google.com/web/
/37/	CDM Allometric Equation_ar-am-tool-17-v1(2)
/38/	Destructive Sampling, Bambusa polymorpha 01.2022
/39/	Destructive Sampling, Bambusa textilis 01.2022
/40/	Pictures Destructive sampling 2022
/41/	Biomassofblackpetungbamboo 2015
/42/	Erosion Control mapping report_2020

Reference	Document
/43/	Socio Economic Baseline Assessment
/44/	2022_Overview Stakeholder and Community Meetings
/45/	Survey data
/46/	Secoko Pilot Project Final Report 13.04.22_for email
/47/	EcoPlanet Bamboo_Meeting Report_23-25
/48/	Structure RWRB
/49/	SOP QA/QC Procedures
	https://verra.org/
	https://registry.goldstandard.org/projects?q=&page=1
	https://cdm.unfccc.int/Projects/projsearch.html
	International Carbon Action Partnership (ICAP) - ETS Map (icapcarbonaction.com)
	https://americancarbonregistry.org/
	https://www.csaregistries.ca/albertacarbonregistries/home.cfm
	https://www.investopedia.com/terms/s/stakeholder.asp

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APPENDIX IV: INTERVIEWS

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Reference	Mean		Name	Organisation / Function
/IM01/	Visit	<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms.	Camille Rebelo	EcoPlanet Bamboo/COO
/IM02/	Visit	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Mpame Rodney	EcoPlanet Bamboo/Project supervisor
/IM03/	Visit	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Musana S. Bernard	Rwanda Water Board/Head of Knowledge and Forecasting Department
/IM04/	Visit	<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms.	Pamela Rozigana	Rwanda Water Board / Catchments Restoration and Erosion Control Division Manager
/IM05/	Visit	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Habanabakize Jean Marie Vianney	EcoPlanet Bamboo/Bamboo and Community Technician
/IM06/	Visit	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Havutimura Patrick	EcoPlanet Bamboo/Field Agronomiste
/IM07/	Visit	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Nshuti Theophile	Rwanda Water Board/Agronomist Specialist
/IM008/	Visit		A detailed list of further interviewees (Workers/Community Members/Employees) is available as reference but not publicly due to privacy concerns ^{/10/} . The list can be made available to Verra upon request.	