

PLAN  VIVO

PV Climate

**Smallholder Agriculture
Monitoring and Baseline
Assessment Methodology
Minor Revision Approval
Report**

Version 1.0

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Overview

Review Details	
Report Title:	Smallholder Agriculture Monitoring and Baseline Assessment Minor Revision Approval Report
Version:	1.0
Methodology/Methodological Elements Reviewed:	PT001: Smallholder Agriculture Monitoring and Baseline Assessment [Version 2.1; 09 September 2025]
Sectoral Scope:	AFOLU
Client:	Plan Vivo
Date of Approval:	16 th February 2026
Approved by:	Farai Chikomba and Akshaya R.

1 Introduction

1.1 Objective and Scope

Objective:

The purpose of this assessment is to conduct a review of the proposed changes to PT001, v2.0

Scope of Assessment:

This assessment includes a review of the tool's procedures as they relate to the proposed changes and is limited to confirming that the revisions meet the criteria for a Minor Revision as set out in the Procedures Manual. The assessment specifically verifies that the revisions do not:

- Alter eligibility criteria for project activities.
- Introduce new calculation methods for carbon benefits.
- Affect the core logic of the baseline scenario or additionality assessment.
- Involve changes to the leakage assessment.

The resulting updated tool, v2.1, remains compliant with the latest Methodology Requirements, which were previously assessed during the full approval of the previous iteration, v2.0.

1.2 Reviewer Details

Table 1. Reviewer Details.

Role	Name	Affiliation	Relevant Expertise	Contribution to Review (Y/N)	
				Technical Review	Report Writing
TRP Reviewer	Farai Chikomba	TRP, External	Carbon technical specialist with four years of experience in carbon technical analysis including carbon ex-ante modelling in python using peer-reviewed models that include SNAPGRAZE, DAYCENT, MEMS and RothC.	Y	Y
TRP Reviewer	Akshaya R	TRP, Internal	Carbon-based land-use project specialist with ~5 years of experience in the development of ARR, agroforestry, mangrove, and agriculture projects, with expertise in environmental impact assessment, GIS analysis, stakeholder coordination, carbon modelling, R Studio, and Roth-C application.	Y	Y

1.3 Summary Description of Minor Revision

Table 2. Revision Log

Methodology/Module/Tool	Version	Section	Description of Change	Reason for Change
PT001	Version 2.1; 09 September 2025	Section 7 – References; Annexes	Updated version numbers across the document to reflect the publication of	To maintain document control and accurate internal referencing

			PU001 (v1.1) and associated Model documents (v1.2).	
PT001	Version 2.1; 09 September 2025	Annex 1 – SHAMBA Model v1.2	Bug fixes to several of the SHAMBA Tool component code scripts, parameters, values and equations including resolving comments made during previous external review and addressal of duplicates.	To ensure optimal model performance, consistency and alignment with best available data sources. To provide clarity between default values and ensure users understand where specific parameters must be updated.
PT001	Version 2.1; 09 September 2025	Annex 1 – SHAMBA Model v1.2	<ul style="list-style-type: none"> Updated the Python code script to clarify ambiguous equations, units, and assumptions. Renaming of outdated code script names. 	To ensure consistency in the model performance and provide clarity for users.
PT001	Version 2.1; 09 September 2025 and	Annex 1 – SHAMBA Model v1.2	Added clarification on discrepancies managed through conservative parameter selection and	<ul style="list-style-type: none"> Model Description Document references a comparison between

	<p>Version 1.1; 21 May 2024</p>		<p>broader uncertainty calculations.</p>	<p>RothC (v26.3) and SHAMBA implementation, indicating that simulated SOC estimates can differ by no more than 0.5 tC/ha across tested scenarios. However, the SHAMBA Tool does not run RothC internally during project application, meaning this comparison is not available as a routine project-level check.</p> <ul style="list-style-type: none"> • This comparison is thus established solely to suggest the general validity of RothC implementation within SHAMBA. As
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				<p>the tool does not contain built-in mechanisms to address differences between the two models, projects are expected to manage any potential divergence using conservative input assumptions and uncertainty analyses as per the steps outlined in PT001 and PU005.</p> <ul style="list-style-type: none"> • This clarification is added herein to strengthen clarity around the treatment of SOC-related uncertainty and ensures reviewers, users, and project
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				<p>developers share a consistent understanding until further guidance is incorporated in future methodological updates.</p>
PT001	<p>Version 2.1; 09 September 2025</p>	<p>Annex 2 – SHAMBA Model Description v1.2</p>	<ul style="list-style-type: none"> • Change to using the current IPCC 2019 default factors from the old IPCC 2006 default factors for crop C content and parameters, combustion and emission factors and volatilisation fractions. • Change of old source for Global Warming Potentials (GWPs) to the current IPCC Sixth Assessment Report (2021) values. 	<p>To align the SHAMBA Tool with current data and improve model performance.</p>

			<ul style="list-style-type: none"> • Change from using HWSO for Soil data to SoilGrids 2.0 via API. • Climate data now being extracted from OpenMeteo API request for daily ERA5 data. 	
PT001	Version 2.1; 09 September 2025	Appendix 1, SHAMBA Model Description v1.2	Added guidance explaining how different parameter in the script may impact the consideration in the model and consideration of exceptional cases	To help users understand how to set parameters based on project specifics.
PT001	Version 2.1; 09 September 2025	Shamba-input_output document – Annex 1 – SHAMBA Model v1.2	Added guidance clarifying proportions and units required by the model	To prevent misinterpretation of percentage inputs and avoid data-entry errors in the model.
PT001	Version 2.1; 09 September 2025	Section 5.4 Expected Baseline and Project Emissions	Added a cross-reference to the approved tool PT003 for model calibration	Requirement for validation of input parameters and model accuracy to ensure robust baseline calibration
PT001	Version 2.1; 09	Section 5.5 Actual	Added a cross-reference to the	Focus on the use of validated, site-

	September 2025	Project Emissions	approved tool PT003 for model calibration and validation	specific models for robust quantification of actual carbon benefits.
PT001	Version 2.1; 09 September 2025	Annex 1 – SHAMBA Model v1.2	Crop residue calculation was updated to only include the intercept value (b) if the crop yield is greater than zero	Prevents positive residue values when no crop was grown.
PT001	Version 2.1; 09 September 2025	Annex 1 – SHAMBA Model v1.2	Separated the calculation of woody AGB (branch + stem) from the dependent biomass pools (leaves, fine and coarse roots)	Corrects incorrect allocation of biomass for non-woody-AGB pools.
PT001	Version 2.1; 09 September 2025	Annex 1 – SHAMBA Model v1.2	The initial biomass calculation was changed to be the predicted biomass at age = 1.	This corrects the previous approach where initial biomass was incorrectly associated with whatever the first year of user data was.
PT001	Version 2.1; 09 September 2025	Annex 1 – SHAMBA Model v1.2	Added ValueError checks in all inverse functions and setting a default value for small	Addressed missing and invalid boundary handling for inverse equations

			above-ground biomass inputs.	in the tree growth model
PT001	Version 2.1; 09 September 2025	Annex 1 – SHAMBA Model v1.2	The calculation for crop residues removed was corrected to use the total above-ground (AG) residues	Fixed a bug that previously resulted in the proportion removed being accounted for twice.
PT001	Version 2.1; 09 September 2025	Annex 1 – SHAMBA Model v1.2	A new two-parameter exponential equation for fitting growth curves was introduced.	Model improvement: greater variety of potential biomass curves
PT001	Version 2.1; 09 September 2025	Annex 1 – SHAMBA Model v1.2	The system was updated to raise a ValueError and prompt the user to provide CSV soil data if API data for soil C and clay % properties is missing	If the API data was missing, the function returned zero values for soil carbon and clay percentage properties, allowing the model to continue running.
PT001	Version 2.1; 09 September 2025	Appendix 1, SHAMBA Model Description v1.2	Defined parameter α_d listed in Equation 10	To improve the usability of the Model Description.
PT001	Version 2.1; 09 September 2025	Appendix 1, SHAMBA Model	The guidance now specifies that when using non-IPCC crop types -	The IPCC crop defaults and equations used are primarily

		<p>Description v1.2</p> <p>especially crops with multiyear lifecycles - users should determine their own coefficients (a_i and b_i), divide total lifetime yield by the crop's lifespan to estimate annual yield, and set b_i (the intercept) to zero to avoid inflating residue estimates. -IPCC crop types - especially crops with multi-year lifecycles - users</p>	<p>designed for annual crops, and are not appropriate for tree crops.</p>
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2 Justification and Impact Assessment

2.1 Documents Reviewed

The assessment was conducted as a desk review of the submitted changes to the SHAMBA Tool PT001 v2.1. The review included assessing the changes made to the SHAMBA Tool python code scripts, updates of default factors to current versions and a general update to the current python environment.

A structured technical review was conducted to assess the clarity, consistency, and correctness of the SHAMBA model documents including the codes, input files, and associated calculations to ensure alignment with the PV Climate methodology Requirements. The assessment was conducted as a desk review of the submitted changes to the SHAMBA Tool PT001 v2.1. The process involved several rounds of review through CARs, NIRs, and Observations.

Several items were closed after confirming that inconsistencies were addressed, bugs were fixed, improving documentation, and updating calculation logic. Overall, the minor review process was intended towards improved accuracy, consistency, and usability of the SHAMBA model by ensuring that assumptions, parameters, equations and considerations are clearly documented and aligned with scientific references and the PV Climate Methodology requirements.

Table 3. Documents reviewed or referenced.

Document ID	Author	Title and Version	Source/Provider
1	The University of Edinburgh Land Team	PT001: Smallholder Agriculture Monitoring and Baseline Assessment V2.1	The University of Edinburgh Land Team
2	The University of Edinburgh Land Team	SHAMBA Model Description v1.2	The University of Edinburgh Land Team
3	The University of Edinburgh Land Team	SHAMBA Model v1.1	https://github.com/shamba-admin/shamba
4	The University of Edinburgh Land Team	SHAMBA Model v1.2	https://github.com/shamba-admin/shamba/pull/27
5	Helen Hughes	SHAMBA v1.2 Change and Review List	The University of Edinburgh Land Team

2.2 Revision Assessment

Table 4. Methodology Minor Revision Review Summary

Question	Yes/No	Rationale/Further Comments
Does the revision alter the Methodology's scope, applicability, or core logic?	No	These minor updates for clarification, model performance and alignment with newer global data sources.
Does the revision alter or introduce any new	No	No, the change only clarifies unclear areas and remains unchanged.

calculations for Carbon Benefits?		
Does the revision have a material impact on the estimated Carbon Benefits (cumulative > 5%)?	No	Numerical changes within the model code are small and are extremely unlikely to drive changes in carbon benefits >5%, with the exception of the optional use of a new source of climate and soil data.
Does the revision require new data or monitoring protocols to be applied by projects?	Yes	These changes correct errors in the model's code that does not alter data inputs rather updates the defaults to the latest available data, approaches and best fit equations.
Is the revision consistent with the PV Climate Methodology Requirements?	Yes	Yes, the change is to ensure the methodology remains compliant after a standard update

2.3 Assessment Opinion

1. The documentation of the minor revision provides a clear and accurate description of the change.
2. The methodology, with the incorporated revision, continues to meet the PV Climate Methodology Requirements.
3. All Corrective Action Requests (CARs), New Information Requests (NIRs), and Observations raised have been adequately addressed and closed with minor suggestions that are not material for non-compliance with PV Climate Methodology Requirements.
4. The consideration of the linking of the Model Description Document directly to the underlying CSV parameter files in a future update is noted for user functionality and operational convenience.

3 Signature

Review Team:

Name of TRP member: Farai Chikomba

Job Title: Carbon Technical Analyst

Date: 14/02/2026

Signature:



Name of TRP member: Akshaya R

Job Title: Technical expert in Land Use and Forestry

Date: 14/02/2026

Signature:



Plan Vivo Secretariat Approval:

Name: Hamish McGill

Date of approval: 16/02/2026

Signature:



Annex 1 – Feedback Spreadsheet

The feedback spreadsheet is available upon request. This feedback spreadsheet summarises the assessment and resolution of NIRs, CARs, and Observations raised for the minor revisions to the updated tool. Please email info@planvivofoundation.org for access or further information.