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PM.0001 Expert review feedback and response

Short rotation Paulownia tree cultivation

May 22, 2024

Overview

This document describes the detailed response of Proba to the expert review feedback from Foodchain ID. Foodchain ID has performed an expert review on version 0.91 of the methodology “Carbon farming through short rotation forestry”. Proba will process all changes in version 0.92 of the methodology and present these to the Advisory Board.

The document is divided in three parts:

- General feedback on the whole document
- Main recommendations: five critical recommendations and eight minor recommendations
- Specific comments in the text of the methodology

General feedback

Comment ID: 001	
Author: Foodchain ID	
Original language: English	
“The general structure is commendable, providing a comprehensive methodology for development of carbon projects as proposed. The information is logically organised to align with project development steps. It is notable that the document includes references, drawing from scientific publications, standards, and research, which serve as valuable guidelines for project developers. However, to enhance transparency, it is advisable to directly reference the equations used for emission and removals calculations. Additionally, expanding the range of references to include standards from voluntary carbon markets (VCM) and recently launched protocols from internationally recognized sources would further improve the document. Addressing the challenge of limited information on Paulownia species for European sites is crucial. Strengthening monitoring efforts will help refine estimations and provide more diverse and relevant data tailored to project-specific sites.	

Main recommendations in expert review document

Comment ID: 101	
Critical recommendation	
Author: Foodchain ID	
Original language: English	
“Must ‘dig deeper’ into additionality. This includes splitting the section and being much more specific. This then directly relates to how leakage, baseline estimations, and permanence is established and justified.”	
Response/changes	
In general, additionality is already included in the Project Overview Document template and the Proba standard. However, for the avoidance of doubt, we have included a separate phase presenting the additionality as an important part of the process while indicating relevant tools in order to be identified by project developers. “Include additionality as one of the main project steps in the “Process Overview” Section.”	
Changes can be found: Page 21,22,23, “2.2. Additionality”	

Comment ID: 102	
Critical recommendation	
Author: Foodchain ID	
Original language: English	
“Monitoring details must be expanded. This includes the sampling approach, frequency, error, monitoring of alien species, etc.”	
Response/changes	
We adjusted the text: Regarding sampling approach (page 37):”A statistically robust sample of trees at each plantation location should be established, while reflecting a broad diversity of tree measurements. This diversity is essential for capturing a comprehensive dataset that accurately represents the variability in the plantation's biophysical attributes. Based on the total number of trees per location, a specific number of trees should be sampled to ensure representativeness. Please refer to the A/R Methodological Tool “Calculation of the number of sample plots for measurements within A/R CDM project activities”. This should be provided in detail in the Project overview document.”	

Regarding frequency (page 37): “Measurements should be scheduled within a designated annual time frame (same season) to avoid external factors that affect tree ecophysiology, such as trunk shrinkage and leaf fall due to seasonal conditions. This procedure ensures consistency and accuracy in data collection.” and “The monitoring and reporting activities should be performed by individuals with the adequate knowledge to conduct the monitoring, evaluation and process of the outcomes. Regarding error (page 37): “Moreover, an uncertainty percentage based on sampling error should be established to accurately account for variations and ensure reliable measurements (details in section “2.3. Uncertainty calculation”)” Regarding monitoring of alien species (page 27): “EU Compliance for Paulownia: Countries within the EU are deemed suitable for Paulownia species plantations, based on the EU's invasive alien species report.”
Changes can be found: Page 27, 37

Comment ID: 103	
Critical recommendation	
Author: Foodchain ID	
Original language: English	
“Permanence must be justified. Justify the 40-year period with references and/or conduct a life cycle analysis to understand and quantify Scope 3 emissions more fully.”	
Response/changes	
The concept of permanence was included in the chapter of Applicability. For clarification reasons we distinguished these 2 concepts into 2 different chapters. On page 12 a new chapter has been included (“1.3. Permanence”). In this chapter detailed description of the Permanence has been provided and relevant guidelines on how to establish non-Permanence risk can be found.	
Changes can be found: Page 12,13, “1.3. Permanence” and “1.3.1. Assessment and management of non-Permanence risk”	

Comment ID: 104	
Critical recommendation	
Author: Foodchain ID	
Original language: English	
“Justify Buffer. Include justification and references.” “This is confusing because there should be either (1) an uncertainty deduction, like soils, or (2) a certain confidence interval obtained, like other forestry protocols PLUS a % set aside for the Reserve Buffer in the case that there are future reversals.” “My suggestion is to take into account the Non-Permanence Risk Tool to define this percentage considering the more relevant and possible risks. For the Paulownia methodology, risks may consider market and customers risks additionally to AFOLU.”	
Response/changes	
Firstly, we distinguished the buffer pool and the uncertainty sections. We updated the buffer pool section 2.8.6: “ Lastly, a buffer pool percentage will also be applied. A buffer Pool is a reserve of Carbon Credits established to cover potential losses in GHG Projects, ensuring the integrity of emissions reductions or removals over time. The size of the buffer Pool should be determined based on the assessed risk level of each project and non-permanence risk, allowing for project-specific adjustments. Incorporating this buffer ensures that the reported NCYannual reflects a proper, conservative estimate, safeguarding against overestimation and aligning with best practices for realistic and responsible carbon accounting. If the project developer can guarantee that the wood will be used in long-term carbon storage materials, such as construction buildings, it can further enhance the permanence and reliability of the carbon sequestration. This assurance means that the carbon stored in the wood remains sequestered for extended periods. A minimum buffer pool based on the Proba standard is 10%.”	
Changes can be found: Page 44, 45	

Comment ID: 105	
Critical recommendation	
Author: Foodchain ID	
Original language: English	
“Optional opportunity. Consider a wider selection of tree species. While this will include more research and additional allometric equations, the benefits may be very valuable.”	

Response/changes
In this stage of methodology development, we will focus entirely on Paulownia species. We understand this opportunity of including a wider selection of tree species. We will investigate it further, and reconsider incorporating these species in a future version of the methodology.
Changes can be found: NA

Comment ID: 106	
Author: Foodchain ID	
Original language: English	
A construction timber life cycle assessment may be considered for permanence, emissions calculations and removals, and project lifetimes.	
Response/changes	
We define the scope of the methodology: “Each step is specifically outlined, offering a clear path to measure, monitor, and quantify CO2 sequestration of the project from the establishment of the plantation until the delivery of the wood that will be processed into timber and will be used in long-lifespan constructions.” “A life cycle assessment (LCAs) of the products that are made out of the Paulownia wood in later stages of the project (presented in the POD) will assist in identifying the specific carbon storage duration and end-of-life of the products.”	
Changes can be found: Page 9, Page 12	

Comment ID: 107	
Author: Foodchain ID	
Original language: English	
Revisit prior land-use criteria to ensure deforestation-free areas within a certain time boundary. Include additionality as one of the main project steps in the “Process Overview” Section.	
Response/changes	
We included additionality as a project step. Relevant part in detail in later inside the text comment.	

Prior deforestation-area are not applicable as a prior land use criteria in this methodology
Changes can be found: Page11, “Applicability”, Page 20, “Additionality”

Comment ID: 108	
Author: Foodchain ID	
Original language: English	
Add Carbon Pools Permanence for Carbon Storage (Compare with Land Sector and Removals Guidance, Part 01, Chapter 09).	
Response/changes	
We updated the methodology document including a section in relation to Permanence and Assessment and management of non-Permanence risk.	
Changes can be found: Page 11, 12, “ Permanence”, “Assessment and management of non-Permanence risk”	

Comment ID: 109	
Author: Foodchain ID	
Original language: English	
“Refine leakage calculations in the methodology.”	
Response/changes	
We updated the relevant chapter “2.3.1. Quantifying and managing Leakage” and we propose certain tools for the calculations	
Changes can be found: Page 24	

Comment ID: 110	
Author: Foodchain ID	
Original language: English	
Include fertilizer-derived emissions (Section 2.4.)	
Response/changes	
We included in the table both GHG emissions due to fertilizer machinery and GHG emissions from the soil due to fertilizer application”	
Changes can be found: Page 26, “Project emissions table”,	

Comment ID: 111	
Author: Foodchain ID	
Original language: English	
“Soil organic carbon (SOC) stocks: Clarify details regarding land preparation activities, as soil disturbance impacts SOC related emissions; however, this may be negligible when compared to the project-wide crediting (i.e., <5%). Suggestion: Provide soil management suggestions prior to planting and during the project period.”	
Response/changes	
Emissions related to soil disturbances were already included in the Project emissions table, chapter “2.5. Determine project emissions “. It is stated in the text: “Emissions resulting from soil disturbances associated with land preparation and planting activities should be included.”	
Changes can be found: Page 27	

Comment ID: 112	
Author: Foodchain ID	
Original language: English	
Trees sampling: A more robust tree sampling procedure needs to be defined in order to establish a representative sampling method for MRV activities.	
Response/changes	

We updated the text in the main body:

2.5.4. On-Field Data Collection

“To ensure thorough and representative data collection across diverse environmental conditions within Paulownia plantations, our methodology prescribes a balanced and strategic sampling approach. A statistically robust sample of trees at each plantation location should be established, while reflecting a broad diversity of tree measurements. This diversity is essential for capturing a comprehensive dataset that accurately represents the variability in the plantation's biophysical attributes. Based on the total number of trees per location, a specific number of trees should be sampled to ensure representativeness. Please refer to the A/R Methodological Tool “Calculation of the number of sample plots for measurements within A/R CDM project activities”.

Advanced technologies equipped with camera modules, remote sensing, and communication systems, with the capability to measure biophysical attributes of the plants in agricultural systems and plantation, are widely used today. If project developers have access to these technologies and can ensure and showcase that the collected measurements are characterized by high accuracy and reliability, their use is acceptable/admissible for this methodology. Furthermore, the inclusion of these technologies in monitoring and reporting activities may also be considered. ”

2.5.5. Monitoring and Reporting

“As mentioned in previous sections, there are certain advanced technologies that can assist in the monitoring and reporting regarding the Paulownia plantations. Such technologies not only can facilitate detailed and continuous monitoring of the plantations but also can allow for the reliable assessment of plant health and growth dynamics, which are essential for effective plantation management and reliable calculation of the carbon sequestration potential. “

Changes can be found: Page 34, “2.5.4. On-Field Data Collection” and “2.5.5. Monitoring and Reporting”

Comment ID: 113	
Author: Foodchain ID	
Original language: English	
Alien (invasive) species monitoring: It would be desirable to include safeguards on environmental impacts due to invasive species proliferation.	
Response/changes	
We include in text: “Biodiversity Considerations: ● Monitor the impact of Paulownia plantation on local biodiversity and ecosystems.	

• Regulatory and CPVO Compliance: Ensure plantation adherence to all local, national, and EU environmental and plant protection regulations, securing the CPVO code for Paulownia varieties to fulfill legal requirements and improve traceability. • EU Compliance for Paulownia: Countries within the EU are deemed suitable for Paulownia species plantations, **based on the EU's invasive alien species report**.
Changes can be found: Page 26, “Plantation design”

Specific comments in the text of the methodology document

Comment ID: 201	
Author: Foodchain ID	
Original language: English	
“Additionality, buffer, leakage, permanence may be included in the list of definitions”	
Response/changes	
We recognize the necessity of including these definitions in the document, to enhance the reader's understanding of these key concepts.	
Changes can be found: Page 3, List of definitions	

Comment ID: 202	
Author: Foodchain ID	
Original language: English	
Spelling mistake regarding the word “gasses”	
Response/changes	
We replaced the word “gasses” with “gases” in the whole document.	
Changes can be found: All over the document	

Comment ID: 203	
Author: Foodchain ID	
Original language: English	
“Double check to include reference. Note: data sources that embed the equations must be available in order to ensure traceability.”	
Response/changes	
We included references in every equation. However, the symbols that are used are custom to the scope of the methodology.	
Changes can be found: All over the document, e.g. equation 12, page 53	

Comment ID: 204	
Author: Foodchain ID	
Original language: English	
“Split GWP and CO^2e definitions. Suggestion: add that GWP considers specific time periods that include a range of 100 years.”	
Response/changes	
We have updated our documentation to clearly separate the definitions of GWP and CO2e. Additionally, we have included the specification that GWP calculations consider a standard time period of 100 years to better reflect the comparative long-term effects of different GHGs on global warming.	
Changes can be found: Page 3, “List of definitions”	

Comment ID: 205	
Author: Foodchain ID	
Original language: English	
“Mistaken definition on CDM. My suggestion is to consider CDM definition according to UNFCCC”	

Response/changes
We changed the definition based on the document published by UNFCCC: "https://unfccc.int/files/cooperation_and_support/capacity_building/application/pdf/unepcdmintro.pdf "
Changes can be found: Page 3, "List of definitions"

Comment ID: 206	
Author: Foodchain ID	
Original language: English	
"Specify estimations or information. Also it may be relevant that conservativeness is one of the GHG inventories principles according to the GHG Protocol."	
Response/changes	
We have revised the section on conservativeness to explicitly specify that this principle applies to all estimates of greenhouse gas emissions reductions and removal	
Changes can be found: Page 4, "List of Definitions"	

Comment ID: 207	
Author: Foodchain ID	
Original language: English	
Regarding the definition of Diameter at Breast height (DBH) there was a comment: "Forest inventory input through (...)"	
Response/changes	
We adjusted the definition of DBH	
Changes can be found: Page 4, "List of Definitions"	

Comment ID: 208	
Author: Foodchain ID	
Original language: English	
Regarding the definition of CDM there was a comment: “instead of measure, you should write Collect, account, calculate”	
Response/changes	
We adjusted the definition of CDM	
Changes can be found: Page 4, “List of Definitions”	

Comment ID: 209	
Author: Foodchain ID	
Original language: English	
Regarding the definition of harvest cycle there was a comment: “instead of maturity, you should write <Biomass accumulation or increment. Note: as we are taking as an assumption short rotation harvesting, trees are note going to achieve maturity>”.	
Response/changes	
We adjusted the definition of harvest cycle	
Changes can be found: Page 4, “List of Definitions”	

Comment ID: 210	
Author: Foodchain ID	
Original language: English	
Regarding the definition of Volume there was a comment: “instead of tree biomass you should write <typically the trunk (wood) biomass>”.	
Response/changes	
We adjusted the definition of Volume	
Changes can be found: Page 5, “List of definitions”	

Comment ID: 211	
Author: Foodchain ID	
Original language: English	
Proposed change: “instead of just mentioning Paulownia include species scientific name (most common)”	
Response/changes	
We change the text to: “Paulownia species such as Paulownia tomentosa, Paulownia elongata, known for their rapid growth and adaptability…”	
Changes can be found: Page 10, “Paulownia characteristics”	

Comment ID: 212	
Author: Foodchain ID	
Original language: English	
Proposed change: “The methodology is not applicable under the following conditions" -> Exclude lands of significant historical or social value”	
Response/changes	
We included in this section a bullet point: “Plantations occurring on lands of significant historical or societal value”	
Changes can be found: Page 10, “Applicability”	

Comment ID: 213	
Author: Foodchain ID	
Original language: English	
1.4 Risks -> Perhaps add lack of market for construction materials derived from Paulownia. This is relevant mainly for the next rotations. Did Proba conduct or do they have in hands any	

market analysis for customers criteria for choosing Paulownia timber?
Response/changes
We added as a risk: “Low demand for construction materials originated from Paulownia wood”
Changes can be found: Page 13, “1.4. Risks”

Comment ID: 214	
Author: Foodchain ID	
Original language: English	
Crediting Period -> Proba, please state an explicit length for the crediting period (and project period) for this specific methodology. Given the vagueness of Section 3.2 of the Proba Standard, the current state of this section is not sufficient. (Vitor - What do you think? Is this section too vague?) Answer: Agreed. Crediting periods are a very relevant decision making for project developers due to their revenue providing. In most cases, this period may relate to the monitoring time period that will ensure that carbon units estimations are correct and that they have considered buffer and leakage as inputs for net value credits. In this way, may suggestion is that the crediting period may be issued according to the harvesting (forest rotation) and, in order to address the permanence (leakage) and buffer criteria the LCA may be considered	
Response/changes	
We updated the text and we refer to the Proba standard: . “For Paulownia plantation projects, the Crediting Period must cover at least one full harvest cycle, typically 7 to 10 years (the project developer should define the exact period based on the project's specific cultivation plan). After the determined harvest year, the Project Developer can apply for a Renewal of the Crediting Period, as described in the Proba Standard Section 3.2. The project Developer must re-assess the baseline scenario and project emissions with the new context, and where possible update the carbon sequestration potential of the plantation based on the project’s characteristics.”	
Changes can be found: Page 13, “1.5. Crediting period”	

Comment ID: 215	
Author: Foodchain ID	
Original language: English	
It was suggested to add “and regional or local common practices (for baseline and additionality).”	
Response/changes	
We updated the text: “ Establish baseline scenarios considering land's prior use and regional or local common practises”	
Changes can be found: Page 15, “2. Process Overview, Phase 1: Defining Baseline Scenario”	

Comment ID: 216	
Author: Foodchain ID	
Original language: English	
“Agricultural emissions (mainly fertilisers and liming, if applicable) and electricity may also be relevant emission sources that may be included.”	
Response/changes	
We adjusted the text by including the terms “agricultural activities (fertiliser and pesticide application, land preparation)... electricity consumption…”	
Changes can be found: Page 26, “Project emissions table”,	

Comment ID: 217	
Author: Foodchain ID	
Original language: English	
It was suggested to add: “Baseline scenarios and their respective carbon stocks.”	
Response/changes	
We adjusted the text: “Before initiating the planting process, it is crucial to establish a	

comprehensive understanding of the baseline scenarios and their respective carbon stocks.”
Changes can be found: Page 17, “2.1. Defining baseline scenario”

Comment ID: 218	
Author: Foodchain ID	
Original language: English	
“Maybe it would be restricted during the project period and buffer.” This comment was regarding the baseline scenario 1 “Empty/Fallow land”	
‘Response/changes	
We adjusted the text: “Has no clear plan for future use, and it is restricted to be part of a development project (agriculture, housing, industrial etc.) during the project period and buffer.”	
Changes can be found: Page 17, “2.1.1. Scenario 1: Empty/Fallow land”	

Comment ID: 219	
Author: Foodchain ID	
Original language: English	
They suggested adding: “and pastures (despite that an integrated livestock and forestry plantation land use may be considered).”	
Response/changes	
We updated the text: “This phenomenon may occur when converting cropland or pasture land into a Paulownia plantation.”	
Changes can be found: Page 22, “2.2. Calculation of Leakage”	

Comment ID: 220	
Author: Foodchain ID	
Original language: English	
“The input data in Table 2 should be a REQUIREMENT in the POD, not just a template	

example. “
Response/changes
We updated the text: “Table 2 illustrates the table template that is required by the project developer to utilize for the collection of the necessary data that need to be submitted related to the Paulownia plantation's attributes (input data)”
Changes can be found: Page 23, “2.3. Plantation design”

Comment ID: 221	
Author: Foodchain ID	
Original language: English	
“In one hand, if fertilization activies are included during the planting operations, N^2O must be included. On the other hand, if fertilization is a splited operation CO^2 (due to fossil fuel combustion) and N^2O must be included in this step. Note: if fossil fuels combustion due to fertilization operations are already included in maintenance machinery, please disconsider this in order to avoid double issuance.”	
Response/changes	
We updated the project emissions table in order to distinguish the emissions due to fertilizer application machinery and GHG emissions due to theN2o emissions that occur from the soil due to the fertilizer application. We also updated the equation 3 and equation 6	
Changes can be found: Page 25,26,28,29, “2.4.2. One-time project emissions” and “2.4.3. Recurring emissions”	

Comment ID: 222	
Author: Foodchain ID	
Original language: English	
“Leakage calculation is a very relevant step in carbon offsets project development because this calculation is going to provide safeguards that the carbon removed in project that is going to be traded is not going to be emitted anywhere due to the project issuance. Considering that, my suggestion is to keep this bullet but provide some guidance regarding to how to	

define the leakage potential. Note: it's relevant to enforce that leakage percentage is going to be splited from the project carbon revenue and will have a longer payment period, after carbon pools permanence assurance through monitoring. In order to halt vagueness, my suggestion in to provide more guidance through some Non-permanence standards, like the ones cited above in Addiotionality Section, and also to take advantage of Timber Construction LCA information (even if secondary data). Note: leakage may consider the land use shift from the previous land use for Paulownia plantation and product use and final destination)."
Response/changes
WE updated the text and included a new chapter "2.3.1. Quantifying and managing Leakage" which give instructions of how to estimate potential leakage in relation to the selected baseline scenario. We instruct project developers to use the IPCC and CDM tools, to accurately estimate and quantify the leakage."
Changes can be found: Page 24,25, "2.3.1. Quantifying and managing Leakage"

Comment ID: 223	
Author: Foodchain ID	
Original language: English	
"Section 1.4 Additionality -> Need explict details so that the project cannot be question. Also explicit guidelines strength the VV process. Answer: Additionality is one of the most relevant eligibility criteria for carbon project development and must be observed as a mandatory criterion in almost every carbon offsets methodologies. This step is also relevant to the credits origination and their valuation to market, embedded in integrity and traceability – both relevant trends that many investors seek on carbon tradings and there are several companies that provides rating to carbon projects according to different patterns. To assess many of requisites, it's relevant that additionality and base line may be structured jointly and in accordance with international standards. In this way, taking in account that the Paulownia methodology provide as reference the CDM Methodological Tool, my suggestion is to have a complementary VCM approach considering Verra Methodoloy - VT0001 Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities, v3.0 (available in: HYPERLINK "https://verra.org/methodologies/vt0001-tool-for-the-demonstration-and-assessment-of-additionality-in-vcs-agriculture-forestry-and-other-land-use-afolu-project-activities-v3-0/"VT0001 Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities, v3.0 - Verra). For this specific methodology, I believe that additionality may be included as an splited topic in the project step (Sections 2 and 2.2. -new) in order to describe briefly this demonstrations steps and best practices for them. Regarding to best practices that are going to be necessary for VVB are:	

Consider a landscape approach when defining the believable scenarios that may compound base line, that can gather a wider range of land uses despite the one that have been constantly applied in the target property. In this case, surrounding and regional land uses, most common land uses and time analysis may be useful to oversee the main trends that would lead inputs that may impact the additionality eligibility like: common practices in region, trade-offs that are going to happen during land use change for the project development and will help to strengthen the preferred base line scenarios decision making; When in the financial analysis, be as much company specific as possible to ensure that this analysis would lead to a prevision that matches with the target property reality. It's relevant to include here the monitoring costs with the project emissions and removals (after a monitoring plan is defined, including Scope 03 emissions due to product use). In this task, references and sources are particularly relevant to assure the traceability during the third-party audit and verification and the information may be aligned with leakage prediction, revenue impacts of the land use trade-off, shift costs and carbon permanence time of the project. For additional information on Non- Permanence standards please check Global Council (HYPERLINK "https://nam10.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.globalcarboncouncil.com%2Fwp-content%2Fuploads%2F2024%2F02%2FNon-Permanence-Risk-Tool.pdf&data=05%7C02%7Cvitor.trigueirinho%40scheffer.agr.br%7C7980f9f802194c94a37208dc65334548%7C634f3c86642c4476badef47ecbb8da08%7C1%7C0%7C638496518106331458%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C0%7C%7C%7C&sdata=wzgfo79Ea4cQkoaN6r6TOiBv63klONVMa13aKbHfMdM%3D&reserved=0"https://www.globalcarboncouncil.com/wp-content/uploads/2024/02/Non-Permanence-Risk-Tool.pdf) and CDM standards (HYPERLINK "https://nam10.safelinks.protection.outlook.com/?url=https%3A%2F%2Funfccc.int%2Fresource%2Fdocs%2F2014%2Fsmsn%2Figo%2F145.pdf&data=05%7C02%7Cvitor.trigueirinho%40scheffer.agr.br%7C364a984559864c856f6908dc65332ad6%7C634f3c86642c4476badef47ecbb8da08%7C1%7C0%7C638496517655037770%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C0%7C%7C%7C&sdata=OKyyRsDQ5W7M1dUvFLHxJ%2BR59%2Fv0NpivU5rdTmHLIcU%3D&reserved=0"https://unfccc.int/resource/docs/2014/smsn/igo/145.pdf). Note: please observe that, according to some methodologies, barrier analysis is not a mandatory requirement for additionality demonstration in some cases, particularly when financial assures the eligibility criteria attendance. It's important to enlight that barrier analysis can be an useful tool but their applicability may be a carbon project developer decision to be made.``
Response/changes
It was already included in the Project overview document template and the Proba standard. However, for the avoidance of doubt, we include in the methodology process a separate phase presenting the additionality as an important part of the process while indicating relevant tools in order to be identified by project developers.
Changes can be found: Page 21,22,23, "2.2. Additionality"

Comment ID: 224	
Author: Foodchain ID	
Original language: English	
“Suggest to include: "and to avoid GHG emissions underestimations".” on Section “2.4.1. Total Greenhouse Gasses (GHG) sources”	
Response/changes	
We updated the text: “To accurately calculate total greenhouse gas (GHG) sources and to avoid GHG emissions underestimations in this period…”	
Changes can be found: Page 26, “2.4.1. Total Greenhouse Gasses (GHG) sources”	

Comment ID: 225	
Author: Foodchain ID	
Original language: English	
“As I understand, these two deduction options that may be chosen are going to impact on how the credits are going to be originated by the crediting period providing a single or current deduction on the revenue. If the developer chooses to discount all the one-time emissions in the first harvesting rotation, the net carbon for credits units origination for this first issuance is going to be lower but the upcoming are only going to consider the GHG recurring emissions. Two important aspects may be observed here: the deductions may have the same deadline as the project lifetime and any eventual review of Global Potential Warming (GWP) during the project live may demand recalculation on these emissions.”	
Response/changes	
We included in the section: “Note: During the lifespan of the project, any revisions to the Global Warming Potential (GWP) values may require a recalculation of the project emissions. This ensures that the project remains aligned with the most current scientific and regulatory standards”	
Changes can be found: Page 27, “2.4.2. One-time project emissions (equation 2)”	

Comment ID: 226	
Author: Foodchain ID	
Original language: English	
“It's relevant to check about the tree's waste, stump height (left in field) and some wood processing techniques that may impact final biomass accumulation. Note: in some cases, this difference will not be significant.”	
Response/changes	
We state that: “Plant waste is included in the final biomass calculations”	
Changes can be found: Page 33, “2.5.3. Growth Rate Assumptions, Table 5 and 2.5.4. On-Field Data Collection, Table 6”	

Comment ID: 227	
Author: Foodchain ID	
Original language: English	
"Measurements should be scheduled within a designated annual time frame to ensure consistency and accuracy in data collection." Ok, good to see this frequency finally for monitoring. Suggest that this is mentioned earlier. Also suggest that monitoring should be done at the same time every year? Monitoring data collecting (particularly inventory) should be done during the same annual season in order to avoid climate variations in the stem or leaves with the other data collecting. Another thought. Should the methodology specify what professional CREDENTIALS the individuals should have who perform the quantification? My suggestion is to include that the professional or consultancy may have adequate knowledge to conduct the monitoring, evaluation and outcomes.”	
Response/changes	
We adjusted the text: “Measurements should be scheduled within a designated annual time frame (same season) to avoid external factors that affect tree ecophysiology, such as trunk	

shrinkage and leaf fall due to seasonal conditions. This procedure ensures consistency and accuracy in data collection." and "The monitoring and reporting activities should be performed by individuals with the adequate knowledge to conduct the monitoring, evaluation and process of the outcomes."
Changes can be found: Page 34, "2.5.5. Monitoring and Reporting"

Comment ID: 228	
Author: Foodchain ID	
Original language: English	
1st comment: "This is the most critical assumption for the monitoring steps. How will those samples ensure a site-specific representative measurement? , "Trees sampling: A more robust tree sampling procedure needs to be defined in order to establish a representative sampling method for MRV activities." It's also relevant to take in account some forestry inventory good practices: - may be desirable to avoid edge plantation trees (more sunlight available); - mortality accounting of total plantation (for live trees estimation); - basic statistics inputs to ensure sampling representative - sufficiency sampling may be considered as a best practice." *2nd comment*: "I agree with your comment. There needs to be clear sampling plan procedures to select the 30 trees too! From text -> "To ensure thorough data collection, a balanced sampling approach should be adopted, targeting 30 trees characterised by a certain diversity regarding their size (DBH and THT)."	
Response/changes	
We updated the text in the main body: <u>2.5.4. On-Field Data Collection</u> "To ensure thorough and representative data collection across diverse environmental conditions within Paulownia plantations, our methodology prescribes a balanced and strategic sampling approach. A statistically robust sample of trees at each plantation location should be established, while reflecting a broad diversity of tree measurements. This diversity is essential for capturing a comprehensive dataset that accurately represents the variability in the plantation's biophysical attributes. Based on the total number of trees per location, a specific number of trees should be sampled to ensure representativeness. Please refer to the A/R Methodological Tool "Calculation of the number of sample plots for measurements within A/R	

CDM project activities".

Advanced technologies equipped with camera modules, remote sensing, and communication systems, with the capability to measure biophysical attributes of the plants in agricultural systems and plantation, are widely used today. If project developers have access to these technologies and can ensure and showcase that the collected measurements are characterized by high accuracy and reliability, their use is acceptable/admissible for this methodology. Furthermore, the inclusion of these technologies in monitoring and reporting activities may also be considered. "

2.5.5. Monitoring and Reporting

"As mentioned in previous sections, there are certain advanced technologies that can assist in the monitoring and reporting regarding the Paulownia plantations. Such technologies not only can facilitate detailed and continuous monitoring of the plantations but also can allow for the reliable assessment of plant health and growth dynamics, which are essential for effective plantation management and reliable calculation of the carbon sequestration potential. "

Changes can be found: Page 34, "2.5.4. On-Field Data Collection" and "2.5.5. Monitoring and Reporting"

Comment ID: 229	
Author: Foodchain ID	
Original language: English	
"It's desirable that the monitoring happens in the same season. It should happen in order to avoid external factors that affect the tree ecophysiology like trunk shrinkage and leaves fall due to seasonal conditions."	
Response/changes	
We adjusted the text: "Measurements should be scheduled within a designated annual time frame (same season) to avoid external factors that affect tree ecophysiology, such as trunk shrinkage and leaf fall due to seasonal conditions. This procedure ensures consistency and accuracy in data collection."	
Changes can be found: Page 36, "2.5.5. Monitoring and Reporting"	

Comment ID: 230	
Author: Foodchain ID	
Original language: English	
“Soil Organic Carbon (SOC) stocks sampling and estimation may be in accordance with mai international standards like IPCC 2006 Guideline (https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_02_Ch2_Generic.pdf) and ISO.” and “Unclear about what the expected outcomes are for SOC in regards to baseline and project emissions. Is this methodology looking to include SOC removals (I don't think so)? If not, perhaps Tier 1 or Tier 2 approaches are sufficient. Perhaps let's discuss as a group with Proba. As an ARR methodology, SOC removals are optional to include and to monitor, despite for baseline establishment	
Response/changes	
We adjusted the text :” Soil organic carbon is likely to change at a slow rate and is also likely to be an expensive pool to measure. However it should at least be considered, as sequestration of carbon into the soil, or prevention of emissions of carbon from soils, can be important – especially in grazing land and cropland systems – and omission of soil carbon is an omission of a source of reductions in atmospheric greenhouse gases. Potentially, where forest is planted on land that was previously grassland, a loss in soil carbon can occur (because of the very high soil carbon stocks in perennial grassland. Methodologies and tools that can be used for the assessment of SOC are presented below: https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_02_Ch2_Generic.pdf https://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-16-v1.1.0.pdf https://data.apps.fao.org/glosis/?lang=en https://docs.google.com/spreadsheets/d/160MCKKq9HzSUmjJsAV1x5Dv5VdxqItjBnufe9R3L89w/edit#gid=2003143781 “	
Changes can be found: Page 43, “Appendix 1.1. Methodologies and tools to assess SOC”	

Comment ID: 231	
Author: Foodchain ID	
Original language: English	
“Suggestion, IPCC Default Emissions Factors should be used. Other data sources may ONLY	

be used, if they are country-specific emissions factors (Tier 2). Another note, this sentence should be referring to Table 10, not 11, I believe."
Response/changes
We included in this section an explanation table regarding Tier 1,2,3 emission factors and instructions on when to use each Tier. Adjusted text: "Use of default emissions factors from the IPCC is mandatory. Country-specific emissions factors (Tier 2) may be utilized only if they are available and provide a more accurate reflection of local conditions. Databases that provide Tier 2 emission factors are presented in Table 10."
Changes can be found: Page 45, "1.4. Emission Factors Databases"

Comment ID: 232	
Author: Foodchain ID	
Original language: English	
In the chapter where the equation for the net carbon yield is presented they commented: "In this equation, it may be the NYC total. Description may be adjusted" "In this equation, it may be GHGtotal. Description may be adjusted."	
Response/changes	
In order to be more clear fro the reader, we distinguished the equations. One is focused on calculating the annual net carbon yield and the other one the total net carbon yield per harvest cycle.	
Changes can be found: Page 45,46,47, "2.8.7. Calculations of NCYannual and NCYtotal"	

Comment ID: 233	
Author: Foodchain ID	
Original language: English	
"Justify Buffer. Include justification and references." "My suggestion is to take into account the Non-Permanence Risk Tool to define this percentage considering the more relevant and possible risks. For the Paulownia methodology, risks may consider market and customers risks additionally to AFOLU."	

Response/changes
“Lastly, a buffer pool percentage will also be applied. A buffer Pool is a reserve of Carbon Credits established to cover potential losses in GHG Projects, ensuring the integrity of emissions reductions or removals over time. The size of the buffer Pool should be determined based on the assessed risk level of each project and non-permanence risk, allowing for project-specific adjustments. Incorporating this buffer ensures that the reported NCYannual reflects a proper, conservative estimate, safeguarding against overestimation and aligning with best practices for realistic and responsible carbon accounting. If the project developer can guarantee that the wood will be used in long-term carbon storage materials, such as construction buildings, it can further enhance the permanence and reliability of the carbon sequestration. This assurance means that the carbon stored in the wood remains sequestered for extended periods. A minimum buffer pool based on the Proba standard is 10%”
Changes can be found: Page 44, “2.8.6. Buffer pool % (BF)”

Comment ID: 234	
Author: Foodchain ID	
Original language: English	
In accordance with the Proba Standards, this methodology applies exclusively to projects where harvested timber is utilised in construction, ensuring the sequestration of carbon for at least 40 years." -> permanence? Answer: Considering the timber use, the most adequate time definition for carbon permanence would be the life-cycle assessment, according to the Land Sector and Removals Guidance. It’s also going to be relevant to provide how the Scope 03 emissions due to customer use and final destination (Categories 11 and 12) are going to be measured and considered and how wood traceability may be ensured or monitored after harvesting. Note: for this kind of LCA secondary data can be used in order to provide an estimation on emissions. However, during the upcoming years the methodology developer may be encouraged to obtain primary data to this information input and include it in Appendix with emission factors.	
Response/changes	
These are the additions and adjustments we made: “To guarantee that the wood is used as planned rather than for short-term storage products (e.g., wood pellets for biomass power stations, single-use bio-plastics), the project developer will adhere to strict requirements and controls. During the verification event, which may occur up to three years post-harvest, the final use of the wood products will be investigated as part of the verification audit (contracts). This audit will confirm: The total volume of wood products sold and their corresponding carbon content (tCO2e).	

The alignment of these volumes with the Proba Credits that will be issued based on the harvest cycles. The business agreements between the project developer and their customers mandate a 40-year storage period and specify the proportion of the wood destined for long-lasting products and the duration of their use. The auditor must include wood processors or makers of Paulownia wood products in the scope of the Verification audit. This information must ensure and provide traceability down the supply chain.” and “A minimum buffer pool of 10% is required based on the Proba standard. However, considering the project specifications and the information provided by the project developer about the long-term storage of carbon, a higher buffer pool should be considered. This approach ensures greater conservativeness and reliability in the project's carbon accounting.”
Changes can be found: Page 12, “Permanence 1.3” and Page 44 “2.8.6. Buffer pool % (BF)”

Comment ID: 235	
Author: Foodchain ID	
Original language: English	
"Apply a Buffer (%) percentage to enhance conservativeness and reliability in the calculations." (Vitor - What do you think of this? To me this is confusing because there should be either (1) an uncertainty deduction, like soils, or (2) a certain confidence interval obtained, like other forestry protocols PLUS a % set aside for the Reserve Buffer in the case that there are future reversals. Thoughts?) Answer: Buffer calculation is a relevant that seeks to provide some kind of guarantee that carbon credit units risks are considered during the credits Issuance. Despite the way different project certifiers and registers consider this percentage worldwide, including from a reserve pool that is only going to be available after monitoring up to taking other projects credits as a payment for non-planned emissions, the buffer pool range is from 10% to no more than 20%. In this way, my suggestion is to take into account the Non-Permanence Risk Tool to define this percentage considering the more relevant and possible risks. For the Paulownia methodology, risks may consider market and customers risks additionally to AFOLU. Note: monitoring cycle results during the project life must follow-up and register the buffer pool that can be adjusted if necessary.	
Response/changes	
We updated the text: “Lastly, a buffer pool percentage will also be applied. A buffer Pool is a reserve of Carbon Credits established to cover potential losses in GHG Projects, ensuring the integrity of emissions reductions or removals over time. The size of the buffer Pool should be determined based on the assessed risk level of each project and non-permanence risk, allowing for project-specific adjustments. Incorporating this buffer ensures that the reported NCYannual	

reflects a proper, conservative estimate, safeguarding against overestimation and aligning with best practices for realistic and responsible carbon accounting. The project developer must guarantee that the wood will be used in long-term carbon storage materials, such as construction buildings, so the permanence and reliability of the carbon sequestration can further guarantee. This assurance means that the carbon stored in the wood remains sequestered for extended periods. A minimum buffer pool based on the Proba standard is 10%. However, considering the project specifications and the information provided by the project developer about the long-term storage of carbon, a higher buffer pool should be considered. This approach ensures greater conservativeness and reliability in the project's carbon accounting.”
Changes can be found: Page 44 “2.8.6. Buffer pool % (BF)”

Comment ID: 236	
Author: Foodchain ID	
Original language: English	
My question... How much decomposition actually happens to stumps because the trees regenerate after harvesting, right? Is this source you mentioned necessary? Answer: Coppice practices normally diverge a little from natural succession trees' initial growth. If you are considering a yield production for biomass, some management is needed, which means that one or two sprouts are going to be conducted and normally additional sprouts and stumps are going to die after they play their role as an energy source for initial growth. Note: if no silvicultural practice is going to be applied, the stumps decomposition may only be considered in the final forestry rotation. Besides this coppice practices, another best practice is to not use the coppice for stumps again after the second rotation, due to yields losses to wood and biomass production on next rotation. This will lead to the stumps decomposition after harvesting and saplings are going to be planted between the old planting lines. Note: please disconsider if it’s not a practice that would be adopted as the project developer.	
Response/changes	
In our methodology, we have considered typical management practices for Paulownia plantations, where stumps regenerate after harvesting. Therefore, the decomposition of stumps is not accounted for as a significant source of emissions. However, if specific project conditions or management practices differ—such as the use of coppicing techniques that involve allowing stumps to decompose after a certain number of rotations—proper adjustments will be made at the project level. For projects that adopt practices leading to the decomposition of stumps, necessary modifications in the carbon calculations will be applied to ensure accuracy and alignment with the actual management practices. This ensures that all potential sources of emissions are adequately accounted for, maintaining the integrity and reliability of the carbon accounting process.	

Comment ID: 237	
Author: Foodchain ID	
Original language: English	
Table 12 – page 44 provides a brief track on how they have arrived in the density value proposal. In my point of view, this value overestimates a little the mean density according to the references they sourced. However there is a lack of this information for Paulownia in Europe and, considering that they suggest some double checks with cubage techniques after harvesting, I believe this is not going to be a problem.	
Response/changes	
To ensure accuracy and reliability, we have incorporated provisions for double-checking these values using cubage techniques after harvesting. The average density value used in our methodology is based on the best available scientific literature. Given the current lack of extensive data for Paulownia species in Europe, we believe this value provides a reasonable estimate for our calculations.Should new, relevant information or research data become available, we will promptly update our methodology to reflect the most accurate and current density values.	

Comment ID: 238	
Author: Foodchain ID	
Original language: English	
I suggest including total biomass assumption considering the sum of AGB and BGB. It also may be relevant to consider total biomass per hectare considering the mortality and number of live trees per hectare. Note: as the expected tree use is for construction, it is desirable that it may reach a minimum DBH in order to assess the expected utilisation minimum size. This may also be considered in the plantation design phase, in order to foster a faster and adequate individual biomass accumulation.	
Response/changes	
We have considered this approach; however, it is important to note that in some projects,	

below-ground biomass (BGB) may not be accounted for in carbon credits. This decision is based on the specific project characteristics and the protocols followed by the project developer. Therefore, we have opted not to showcase total biomass assumptions that combine AGB and BGB to maintain flexibility and accuracy across various project types.

Regarding the minimum DBH, since the wood is intended for timber use, it is the responsibility of the project developer to decide when to harvest the wood based on achieving the desired DBH. Consequently, we present a timeframe of 7-10 years for each harvest cycle. This timeframe is informed by industry standards and practices within the timber industry that utilise Paulownia wood.

Comment ID: 238	
Author: Foodchain ID	
Original language: English	
I suggest including recommendations regarding the right way to position the tool in the trunk to collect the DBH data. This best practice is going to avoid systematic deviation on tree volumes and biomass calculation. Note: There are some very didactic figures like that one available in page 14 of this publication (https://www.ipef.br/publicacoes/acervohistoricoexterno/DocumentosFlorestaisNumero5.pdf).	
Response/changes	
3.2.1. Measuring the Diameter at Breast Height (DBH) of the Paulownia Tree samples Measuring the Diameter at Breast Height (DBH) of trees is a key task in forestry, requiring precise tools like diameter tapes, callipers, and Biltmore sticks. Accuracy is crucial, as DBH measurements contribute to understanding tree health and forest dynamics. Proper use and regular maintenance of these tools are essential for reliable data. Due to the pruning techniques used on Paulownia trees, their shape is easier to measure, resulting in lower measurement errors and reduced uncertainty. MANUAL DIAMETER: "Calibrated Tree Trunk Thickness Gauge”: It is designed for forestry use to accurately measure tree diameters. It has a measuring range of up to 60 cm and weighs 900 grams. Project developers should start by using the measuring tape or stick to find the point on the tree trunk that is 1.3 meters above the ground. This is the height at which you will measure the DBH. Make sure to measure from the uphill side if the tree is on a slope. The calipers should be clean in order for the scale to be readable. One arm of the caliper is fixed at the origin of the scale, while the other arm is movable. The fixed arm of the caliper should be placed on one side of the tree at breast height. The adjustable arm should be moved to the opposite side of the tree, ensuring that the arms are pressed firmly against the	

tree and form a 90˚ angle with the scale.
Project developers should read the diameter directly from the scale where the movable arm meets the scale. This measurement represents the major axis, or the widest diameter of the tree. Then, rotate the calipers 90˚ and measure the diameter at a right angle to the major axis. This measurement is the minor axis. Write down both the major and minor axis measurements.
Example: To calculate the DBH, take the arithmetic mean of the major and minor diameters. The formula is as follows: DBH = (Major Axis + Minor Axis) / 2. For example, if the major axis is 26.7 cm and the minor axis is 25.4 cm, the DBH would be (26.7 + 25.4) / 2 = 26.05 cm.

Changes can be found: Page 60, 3.2. Recommended equipment: