



**Verified Carbon
Standard**

DELAGUA CLEAN COOKING GROUPED PROJECT IN THE GAMBIA



Project title	DelAgua Clean Cooking Grouped Project in The Gambia
Project ID	4000
Crediting period	23-February-2023 to 22-February-2030
Original date of issue	30-November-2023
Most recent date of issue	18-August-2025
Version	4.1
VCS Standard Version	4.5 & 4.7
Prepared by	Climate Secure

CONTENTS

1	PROJECT DETAILS.....	4
1.1	Summary Description of the Project	4
1.2	Audit History.....	5
1.3	Sectoral Scope and Project Type	6
1.4	Project Eligibility	6
1.5	Project Design	11
1.6	Project Proponent	18
1.7	Other Entities Involved in the Project	19
1.8	Ownership.....	19
1.9	Project Start Date	20
1.10	Project Crediting Period	20
1.11	Project Scale and Estimated GHG Emission Reductions or Removals	20
1.12	Description of the Project Activity	21
1.13	Project Location	22
1.14	Conditions Prior to Project Initiation	23
1.15	Compliance with Laws, Statutes and Other Regulatory Frameworks	23
1.16	Double Counting and Participation under Other GHG Programs	23
1.17	Double Claiming, Other Forms of Credit, and Scope 3 Emissions.....	23
1.18	Sustainable Development Contributions	24
1.19	Additional Information Relevant to the Project	27
2	SAFEGUARDS AND STAKEHOLDER ENGAGEMENT	28
2.1	Stakeholder Engagement and Consultation.....	28
2.2	Risks to Stakeholders and the Environment.....	32
2.3	Respect for Human Rights and Equity	33
2.4	Ecosystem Health	36
3	APPLICATION OF METHODOLOGY.....	37
3.1	Title and Reference of Methodology	37
3.2	Applicability of Methodology	38
3.3	Project Boundary	44
3.4	Baseline Scenario	47
3.5	Additionality	52
3.6	Methodology Deviations	54
4	QUANTIFICATION OF ESTIMATED GHG EMISSION REDUCTIONS AND REMOVALS.....	54
4.1	Baseline Emissions	54
4.2	Project Emissions	56
4.3	Leakage Emissions.....	57
4.4	Estimated GHG Emission Reductions and Carbon Dioxide Removals	57
5	MONITORING	59
5.1	Data and Parameters Available at Validation	59

5.2	Data and Parameters Monitored.....	62
5.3	Monitoring Plan.....	67
APPENDIX 1: COMMERCIALLY SENSITIVE INFORMATION.....		75
APPENDIX X: <TITLE OF APPENDIX>		76

1 PROJECT DETAILS

1.1 Summary Description of the Project

A summary description of the technologies/ measures to be implemented by the project

The Grouped Project activity “DelAgua Clean Cooking Grouped Project in The Gambia”, with VCS ID 4000, aims at distribution of Improved Cook Stoves (ICS) to the rural households in The Gambia (Least Developed Country)¹. DelAgua Health The Gambia (Voluntary) Ltd (DelAgua) holds the Project Participant (PP) role, overseeing all communication, management, ICS distribution and ownership rights of the Greenhouse Gas (GHG) Emission Reduction Units (ERU). The distribution of ICS is not mandated by the Gambian law and the Grouped Project is a voluntary initiative being run by the PP. Though, the program is not being implemented because of any government legislation, the PP is implementing the project in association with the Government of the Gambia, and to that effect, the PP has signed an MoU with the authority.

The PP is planning to distribute a total of 200,000² ICS throughout the program’s lifetime. The ICS will be high efficiency cooking devices, leading to a reduction in the indoor smoke levels, time spent on collection of firewood used for cooking meals and boiling water for domestic use (hereafter combinedly termed as kitchen activities), and reduction in the usage of firewood compared with the pre-project scenario. Each beneficiary household will receive only one unit of ICS. The project activity (interchangeably called “program” or GP for Grouped Project) has already distributed over 76,140 ICS as of 31st December 2023.

Expected year-wise cumulative distribution of ICS over program’s lifetime is given below:

Year	Cumulative Distribution of ICS ³
23-Feb-2023 to 31-Dec-2023	76,140
01-Jan-2024 to 31-Dec-2024	150,000
01-Jan-2025 to 31-Dec-2025	200,000
01-Jan-2026 to 31-Dec-2026	200,000
01-Jan-2027 to 31-Dec-2027	200,000
01-Jan-2028 to 31-Dec-2028	200,000
01-Jan-2029 to 31-Dec-2029	200,000
01-Jan-2030 to 22-Feb-2030	200,000

¹ <https://unctad.org/topic/least-developed-countries/list>

² The # of ICS and models specified are not binding and may change during the crediting period. Any new ICS model included shall meet the methodology applicability and grouped project inclusion criteria.

³ This plan is tentative and subject to change based on actual implementation, influenced by market demand and user preferences, deemed outside the control of the PP, and shall not be considered a deviation from the project's description. The number of ICS units outlined in the table serves as an approximate figure for ex-ante calculations and is non-binding.

The location of the project

Under the GP, DelAgua will distribute the project technologies to individual households within the host country the Gambia. The details of the locations of GP are provided in Section 1.13 of this document. All households will be in rural areas of the identified regions in section 1.13 of this document.

An explanation of how the project is expected to generate GHG emission reductions or removals

The program is reducing the usage of non-renewable firewood as fuel used for kitchen activities at household level, thereby reducing the GHG emissions arising out of the burning of firewood in traditional stoves. This reduction in the firewood usage at the household level is achieved by the usage of project ICS, as it has a higher thermal efficiency, therefore, consuming lesser amount of fuel and time spent in kitchen activities. To claim the carbon credits for emission reductions, the project will follow the VCS Methodology from Sectoral Scope 3 - VM0050 “Energy Efficiency and Fuel-Switch Measures in Cookstoves”, version 1.0. The implementation (distribution of ICS units) and parameters set for ER calculations within the project will be monitored on a periodic basis, based on the requirements provided within the applied methodology.

A brief description of the scenario existing prior to the implementation of the project

The scenario existing prior to the implementation of the project activity is usage of traditional cooking devices (3 stone fire), which have very low thermal efficiency value. These cooking devices, prior to the project implementation, consume huge amount of firewood due to the low thermal efficiency. The extensive collection of firewood from the area diminishes the available quantity for meeting kitchen needs, resulting in deforestation and the depletion of carbon sinks. Moreover, the time required for woody biomass collection increases consequently.

The average annual and total GHG emission reduction expected from the grouped project is expected to be 952,596 and 6,668,175 tCO₂e, respectively, over the first 7-year crediting period.

The project is neither transferred nor registered in any GHG mechanism, this project is a green field project and explicitly applying the VCS registration.

1.2 Audit History

Audit type	Period	Program	Validation/verification body name	Number of years
Joint Validation/ verification	23-February-2023-- 31-December-2023)	VCS	Carbon Check Pvt. Ltd.	0.85 (311 days)

2nd Verification	1-January-2024 – 31-October 2024	VCS	SustainCERT SA	0.833 Year (305 days)
Re- quantification	23-February- 2023- 31- October 2024	VCS	SustainCERT SA	1.68 (616 days)

1.3 Sectoral Scope and Project Type

Sectoral scope	03 - Energy Demand
Project activity type	Type II (Energy Efficiency Improvement)

The project activity is designed as a Grouped Project Activity and includes several Project Activity Instances (PAIs) of the same project activity type and sectoral scope into one Project Description. 1 project activity instance (PAI) = 1 Improved cookstove (ICS)

1.4 Project Eligibility

1.4.1 General eligibility

The group project involves energy efficient cookstove distribution which falls under the category of efficiency improvements in thermal applications, therefore it is eligible under the scope of VCS Program. The eligibility of project under VCS Program Section 2.1 of the VCS Standard version 4.7 is demonstrated below.

Table 1: VCS Program scope

S.No.	Scope	Applicability/Justification
1	The seven Kyoto Protocol greenhouse gases.	The program reduces GHG emissions associated with the combustion of cooking fuel. Gases included are CO ₂ , CH ₄ , N ₂ O.
2	Ozone-depleting substances (ODS).	The program does not involve any ODS.
3	Project activities supported by a methodology approved under the VCS Program through the methodology approval process.	The ICS distributed (& to be distributed) in the program uses the methodology “VM0050 “Energy Efficiency And Fuel-Switch Measures In Cookstoves”, Version 1.0.” which is a VCS approved methodology.
4	Project activities supported by a methodology approved under a VCS approved GHG program, unless explicitly excluded under the terms of Verra approval.	Not applicable.
5	Jurisdictional REDD+ programs and nested REDD+ projects as set out in	Not applicable.

	the Jurisdictional and Nested REDD+ (JNR) Requirements.	
2.1.2	The scope of the VCS Program excludes projects that can reasonably be assumed to have generated GHG emissions primarily for the purpose of their subsequent reduction, removal, or destruction.	NA, the grouped project reduces existing emissions from traditional biomass stoves, which would persist without intervention. Improved cookstoves lower fuel use, cut GHG emission, improve health. Unlike excluded projects, it addresses an existing issue, ensuring genuine and verifiable emission reductions.

Table 2: Excluded project activities under the VCS Program

Excluded Activity	Applicability
Grid-connected electricity generation activities using hydroelectric power plants. The exclusion does not apply to ocean energy (e.g., wave, tidal, salinity gradient, and ocean thermal energy conversion). For hydro projects, large scale means a maximum capacity of greater than 15MW, where maximum capacity is the installed/rated capacity or authorized capacity (as determined in the activity approval from the project regulator, government, or similar entity), whichever is lower. Grid-connected means >50% of total generation is exported to a national or regional grid. See the VCS Program document VCS Program Definitions for the full definition.	N/A. The GP activities are energy efficiency measures and do not generate electricity from hydro-power plants/units.
Grid-connected electricity generation activities using wind, geothermal, or solar photovoltaic (PV) power plants. The exclusion does not apply to concentrated solar thermal-to-electricity, floating solar PV, or energy storage systems (e.g., batteries). Grid-connected means >50% of total generation is exported to a national or regional grid. See the VCS Program document VCS Program Definitions for the full definition.	N/A. The GP activities are energy efficiency measures and do not generate electricity from wind, geothermal, or solar power plants/units.

Activities recovering waste heat for combined cycle electricity generation, or to heat/cool via cogeneration or trigeneration. The exclusion does not apply to waste gas recovery or electricity generation using waste heat recovery outside of combined cycle applications (e.g., organic Rankine cycles).	N/A. The GP activities are energy efficiency measures and do not utilize recovered waste heat for any purposes.
Activities generating electricity and/or thermal energy for industrial use from the combustion of non-renewable biomass, agro-residue biomass, or forest residue biomass. The exclusion does not apply to gasification, pyrolysis, combusting biofuels, biogas, fractions of renewable biomass in refuse-derived fuels, agro/forest biomass residues in waste streams that are sent to landfills, CO2 capture and storage from renewable biomass combustion, or thermal efficiency improvements (e.g., cook stoves).	N/A. The project does not involve thermal energy for industrial use and rather pertains to thermal efficiency improvements (cookstoves). Also, the project is located in the least-developed country i.e. the Gambia. For all these reasons, the project is eligible for the VCS program.
Activities generating electricity and/or thermal energy using fossil fuels, and activities that involve switching from a higher to a lower carbon content fossil fuel. The exclusion does not apply to the use of captured flare and/or vent gas or waste containing previously used petroleum products (e.g., used plastics, oils, lubricants).	N/A. The GP activities are energy efficiency measures and do not generate electricity and/or thermal energy using fossil fuels, neither involve fossil fuel switch. The GP includes energy efficiency improvements in thermal applications, i.e. cookstoves.
Activities replacing electric lighting with more energy-efficient electric lighting, such as the replacement of incandescent electrical bulbs with compact fluorescent lights (CFLs) or light emitting diodes (LEDs). Large-scale means energy-efficient improvements with a maximum savings greater than 60 GWh/year or emission reduction greater than 60 kt CO2e per year.	N/A. The GP activities does not include the replacement of electric lighting.
Activities installing and/or replacing electricity transmission lines and/or energy-efficient transformers. Large-scale means energy-efficient improvements with a maximum savings greater than 60 GWh/year or emission reduction greater than 60 kt CO2e per year.	N/A. The GP activities do not include the installation and/or replacement of electricity transmission lines and/or energy efficient transformers.

Activities that reduce hydrofluorocarbon-23 (HFC-23) emissions	N/A. The GP reduces GHG emissions associated with the combustion of cooking fuels.
--	---

The project start date is 23-February-2023. The project-initiated pipeline listing on 09-December- 2022 which is prior to start date of the project and projects meet the requirement for pipeline listing. The project was open for public comment between 03-January-2023 to 02-February-2023. The opening meeting by VVB was done in November-2023 which is after the public comment period was complete.

Eligibility of applied methodology under the VCS Program:

The project applies VM0050 (Energy Efficiency and Fuel-Switch Measures in Cookstoves, Version 1.0), an approved methodology under the VCS Program. As VM0050 does not impose any scale or capacity limits, the project is not subject to restrictions on its size or the number of cookstoves distributed. Additionally, the project is implemented as a Grouped Project with clearly defined geographic and technical criteria, ensuring it is not a fragmented part of a larger activity.

Compliance with the general requirements is described below:

Reference to VCS Standard version 4.7	Requirement	Justification
3.1.1	Projects shall meet all applicable rules and requirements set out under the VCS Program, including this document. Projects shall be guided by the principles set out in Section 2.2.1.	The grouped project meets all applicable rules and requirements as set out under the VCS Program and is guided by the ISO 14064-2:2006
3.1.2	Projects shall apply methodologies eligible under the VCS Program. Methodologies shall be applied in full, including the full application of any tools or modules referred to by a methodology, noting the exception set out in Section 3.14.1.	The grouped project applies VCS approved methodology VM0050, version 1.0 along with tools or modules as applicable, ensuring full compliance.
3.1.3	Projects shall apply the latest version of the applicable methodology in all cases unless a grace period applies to the project as set out in 3.22. Projects shall update to the latest version of the methodology when reassessing the baseline or renewing a crediting period.	The grouped project applies the latest version 1.0 of VCS approved methodology VM0050. Refer to section 3 of the PD below for more details.

3.1.4	Projects and the implementation of project activities shall not lead to the violation of any applicable law, regardless of whether or not the law is enforced.	The grouped project and its instances shall remain in compliance with the applicable local laws. This has also been made an eligibility criterion for inclusion of project activity instances into the grouped project.
3.1.5	Where projects apply methodologies that permit the project proponent its own choice of model, such model shall meet with the requirements set out in the VCS Program document VCS Methodology Requirements and it shall be demonstrated at validation that the model is appropriate to the project circumstances (i.e., use of the model will lead to an appropriate quantification of GHG emission reductions or removals).	Not applicable. The PP has applied the model presented in the applied methodology VM0050 version 1.0
3.1.6	Where projects apply methodologies that permit the project proponent to choose a third-party default factor or standard to ascertain GHG emission data and any supporting data for establishing baseline scenarios and demonstrating additionality, such default factor or standard shall meet with the requirements set out in the VCS Program document VCS Methodology Requirements.	Not applicable. The applied methodology, VM0050 version 1.0 , does not allow for the selection of alternative models. The project proponent has followed the prescribed model outlined in the methodology.
3.1.7	Where the rules and requirements under an approved GHG program conflict with the rules and requirements of the VCS Program, the rules and requirements of the VCS Program shall take precedence.	The project activity applies VCS methodology and so this is not applicable.
3.1.8	Where projects apply methodologies from approved GHG programs, they shall conform with any specified capacity limits and any other relevant requirements set out with respect to the application of the methodology and/or tools referenced by the methodology under those programs.	The project activity applies VCS methodology i.e., VM0050 version 1.0 that does not specify any capacity limit.

3.1.9	Where Verra issues new VCS Program rules, the effective dates of these requirements are set out in Appendix 3 of VCS standard ver 4.7 and Effective Dates or equivalent for other program documents and are listed in a companion Summary of Effective Dates document which corresponds with each update.	The grouped project will adhere to the new VCS Program rules, and the effective dates of these requirements set out in Appendix 3 of VCS standard ver 4.7.
-------	---	--

Eligibility as per section 1.1 of VCS Methodology Change and Re-quantification Procedure

Eligibility Criteria	Justification
The project meets all the applicability conditions of the most recent version of a different active methodology, or the most recent version of the methodology used in a previously approved verification request.	The project applies the latest VCS methodology and fully complies with all the specified requirements.
The project proponent has all the data required to apply the new methodology. Applying a methodology deviation to circumvent having the required data is not permitted.	The project proponent has all the necessary data to apply the new methodology and does not intend to seek a methodology deviation to circumvent or bypass these requirements.
The verification periods being re-quantified are consecutive.	The grouped project's previous verification periods are sequential without any interruptions.
There are active VCUs on the Verra Registry for the period(s) being re-quantified.	The grouped project has active verified carbon units (VCUs) recorded in the Verra Registry for the periods under re-quantification.

1.4.2 AFOLU project eligibility

Not Applicable, as this is not a AFOLU project.

1.4.3 Transfer project eligibility

Not Applicable, as this project is not seeking any transfer from other GHG reduction programs such as CDM.

1.5 Project Design

- ☐ Single location or installation
- ☐ Multiple locations or project activity instances (but not a grouped project)

☒ Grouped project

1.5.1 Grouped project design

Being a Grouped Project Activity, this project will be implemented while fulfilling the eligibility criteria provided in the Table below:

Eligibility criteria as per section 3.6.10 to 3.6.15 of the VCS Standard v4.7

Criterion	How the new project activity instances comply	Evidence
3.6.10 Grouped projects shall specify one or more clearly defined geographic areas within which project activity instances may be developed. Such geographic areas shall be specified using geodetic polygons	Each PAI will have clearly defined geographic areas and such area will be specified using geodetic polygons.	Each PAI will be implemented in Gambia. PP has submitted geodetic polygons to VVB and added details in section 1.13 of the PD below.
3.6.11 Determination of baseline scenario and demonstration of additionality are based upon the initial project activity instances. The initial project activity instances are those that are included in the project description at validation and shall include all project activity instances currently implemented on the issue date of the project description.	Baseline scenario and demonstration of additionality shall be based upon the initial project activity instances	Baseline scenario and additionality has been demonstrated for the overall GP which is included at the time of validation in section 3.4 and 3.5 of the VCS PD below.
3.6.12 Where a grouped project includes multiple project activities, the project description shall designate which project activities may occur in each geographic area.	The project activity(ies) that are included in GP shall define their geographic area in project description section of the VCS PD, and/or Joint Project Description & Monitoring Report.	Each PAI includes distribution of improved cookstoves to households that are dependent on traditional cookstoves using woody biomass for cooking.
3.6.13 The baseline scenario for a project activity shall be determined for each designated geographic area, in accordance with the methodology applied to the project.	Baseline scenario for a project activity shall be determined for each designated geographic area, in accordance with the methodology applied to the project	Baseline scenario has been determined for overall GP for Gambia. Details have been added in section 3.4 of the VCS PD below.

3.6.14 The additionality of the initial project activity instances shall be demonstrated for each designated geographic area, in accordance with the methodology applied to the project	Additionality for a project activity instance shall be determined for each designated geographic area, in accordance with the methodology applied to the grouped project	Additionality has been determined as per the applied methodology for Gambia being the only Geographical Area for the GP. Details have been added in section 3.5 of the VCS -PD below.
3.6.15 Where factors relevant to the determination of the baseline scenario or demonstration of additionality require assessment across a given area, the area shall be, at a minimum, the grouped project geographic area. Examples of such factors include, inter alia, common practice; laws, statutes, regulatory frameworks, or policies relevant to demonstration of regulatory surplus; determination of regional grid emission factors; and historical deforestation and degradation rates	All the factors relevant to the determination of baseline or demonstration of additionality shall be done for the geographical boundary of the grouped project	Assessment of baseline and demonstration of additionality for GP has been done for Gambia. The baseline factors, regulatory surplus and additionality have been established using national level reports and data sources and are applicable to the entire designated geographic area of Gambia. Details have been added in section 3.4.of the VCS-PD below

Eligibility criteria as per section 3.6.16 to 3.6.18 of the VCS Standard v4.7

Table 3: VCS Standard Eligibility Criteria

S No	Criterion	How the new project activity instances comply	Evidence
New Project Activity Instance Eligibility Criteria (Section 3.6.16)			
1	Project Activity Instances (PAIs) must meet the applicability conditions set out in the applied methodology.	PP shall demonstrate compliance with VM 0050 version 1.0 in the VCS PD as applicable.	VCS PD section 3.2 justifying the applicability criteria of applied methodology.
2	Use the technologies or measures specified in the project description.	Only ICS that conform with the GP description are to be distributed in the project. The ICS will be chosen to deliver a level of service at	Manufacturer's specifications. The ICS distributed under the GP is Burn Kuniokoa generation 2 stoves, which is as per

		least equivalent to the baseline appliance.	technology description of the grouped project.
3	Apply the technologies or measures in the same manner as specified in the project description.	The ICS distributed in the PAIs will adhere to the GP description and replace biomass burned in the baseline scenario.	Manufacturer's specifications. The ICS distributed under GP reduces fuel wood consumption due to better thermal efficiency and replaces the baseline traditional stoves, the same can be checked with distribution record and sample survey results.
4	Are subject to the baseline scenario determined in the project description for the specified project activity and geographic area.	All new PAIs will be implemented only in regions within the geographic borders of <i>The Gambia</i> subject to the same baseline scenario determined in Section 3.4 in this Project Description. The geographical location of the project ICS can be traced through the information provided in the distribution database, which includes the latitude and longitude data of the ICS distributed.	ICS Distribution database Each PAI records end user registration database with clear delineation of project boundary i.e. host country of Gambia is provided to the VVB for their reference.
5	Have characteristics with respect to additionality that are consistent with the initial instances for the specified project activity and geographic area.	All new PAIs will use the activity method for demonstration of additionality. Step 1: Regulatory Surplus There is no government mandated programme or policy in host country of this project ensuring the distribution of new project activity instances. Step 2: Positive List The inclusion of new project activity instances will comply with the positive list as it	Step 1: Regulatory Surplus There is no mandatory legal requirement for installation of cookstoves in households/ institutions of Gambia. Step 2: Positive List Further, the PP distributing ICS free of cost to end users, hence there is no revenue stream than sale of

		satisfies criterion 1 where it meets all the applicability conditions of the methodology. Where the project activity installs or distributes stoves at zero cost to the end-user and has no other source of revenue other than the sale of GHG credits, the project activity shall be deemed additional.	VCUs, hence the project activity instances are automatically additional. The above can be checked with end user agreement and declaration from PP on the same. The PP will provide end user agreement and declaration to VVB to support free distribution of ICS.
Eligibility conditions specific to inclusion of New PAIs (Section 3.6.17 and 3.6.18)			
6	The new PAI must occur within one of the designated geographic areas specified in the project description	The distribution of the ICS will be within the jurisdictions of The Gambia, and therefore, the project activity will only distribute to the beneficiaries that are in agreement with the requirements of the program.	Each PAI under grouped project is within host country The Gambia. The same can be checked with distribution data base wherein location details of each end user will be recorded.
7	The new PAI must comply with at least one complete set of eligibility criteria for the inclusion of new project activity instances. Partial compliance with multiple sets of eligibility criteria is insufficient.	The eligibility criteria set must be complied by the PAIs at all points in time throughout the crediting period. If at any point, it is found that the PAI is not complying with the set of eligibility criteria, then it may be excluded from the crediting for the duration of the monitoring period, until it is able to demonstrate the compliance of the eligibility criteria.	The MR will act as the documentary compliance summary. However, for each specific eligibility criteria (as laid down above), the supporting evidence will be provided by the PP. All the PAIs meet the eligibility criteria for inclusion under grouped project activity as demonstrated below.
8	The new PAI must be included in the monitoring report with sufficient technical, financial, geographic and other relevant information to demonstrate compliance with the	The new PAIs will include all the technical, financial, geographic and other relevant information related to the compliance of the applicable set of eligibility criteria & also enable sampling by the VVB.	The MR for the specific monitoring period will act as the supporting evidence for the stated condition/requirement. Each PAIs are part of VCS grouped project validation/verification,

	applicable set of eligibility criteria and enable sampling by the validation/verification body.		hence no further assessment.
9	The new PAI must have evidence of project ownership, in respect of each project activity instance, held by the project proponent from the respective start date of each project activity instance (i.e., the date upon which the project activity instance began reducing or removing GHG emissions).	The PAI related evidence on the project ownership will be in the form of a distribution end user receipt poster. This will be signed by the end user, and a photograph of him/her holding the poster along with the ICS will be saved in the PAI database.	1. A photograph of the PAI distribution first end user holding the poster along with the ICS. 2. A scan of the poster, which will show the first distribution date. 3. The distribution database of the GP will provide the start date in the form of the first sales made by the PAI. Waiver of carbon credits from the end users are submitted to the VVB.
10	The new PAI must have a start date that is the same as or later than the grouped project start date.	The new PAIs will have a start date later than the GP start date.	This can be verified through the GP distribution database, wherein each PAI can be verified for its start date.
11	The new PAI must be eligible for crediting from the later of start date of the project activity instance or the start of the verification period in which they were added to the grouped project, through to the end of the total project crediting period	The PAI will be only eligible for the crediting from its start date through to the end of the project crediting period (only).	1. The start date of the PAI can be checked through the distribution database. 2. The end date of the GP crediting shall be referenced from the VCS Project Registry webpage. 3. The overlap of monitoring periods may be checked through the previous monitoring reports (available publicly on VCS project registry webpage for those periods). The PAIs are eligible for crediting from the start date of the GP through to

			the end of the project crediting period
12	The new PAIs shall not be or shall not have been enrolled in another VCS project	It will be ensured that the PAI that is being enrolled under the VCS GP was not previously enrolled under any other VCS project and will not be enrolled under other VCS project if it is removed from the VCS GP.	Since, for each PAI project proponent is also the implementer, no further approval is required, however for the cases, where implementer other than PP, an approval on the same shall be given by PP in order to include the instance into this grouped project.
13	The new PAI shall adhere to clustering requirement that states the project proponent shall include in a singular project all project activity instances within ten kilometers of another instance of the same project activity and with the same project proponent	It will be ensured that PAI included within 10 kilometers of another instance of the same project activity by the same PP is in a singular project	In compliance with section 3.6.8 of the VCS Standard v4.7, PP has included all the PAIs (i.e., ICS) in a singular project only regardless of their distances from each other (another instance) within the country. There are no other project of the same project activity and by the same PP in the Gambia. Thus, the grouped project complies with the requirement that all project activity instances within ten kilometers of another instance of the same project activity and with the same project proponent are included in a single project only. All the new PAIs shall be included in this project only.
14	Where a capacity limit applies to a project activity included in the project, no PAI shall exceed such limit. Further, no single	The GP does not have any specified capacity limits applicable, since there are no capacity limits defined within the applied methodology, VM0050, ver.	N/A

	cluster of project activity instances shall exceed the capacity limit, determined as follows: Each device that exceeds one percent of the capacity limit shall be identified. Such instances shall be divided into clusters, whereby each cluster is comprised of any system of instances such that each instance is within one kilometer of at least one other instance in the cluster. Instances that are not within one kilometer of any other instance shall not be assigned to clusters. None of the clusters shall exceed the capacity limit and no further project activity instances shall be added to the project that would cause any of the clusters to exceed the capacity limit.	1.0. Therefore, this eligibility criteria are not applicable.	
15	Where inclusion of a new project activity instance necessitates the addition of a new project proponent to the project, such instances shall be included in the grouped project description within two years of the project activity instance start date	It will be ensured that if new PAI necessitates the addition of a new project proponent such shall be included in the GP within two years of the PAI start date.	The project proponent will be added if new PAI necessitates the addition.

1.6 Project Proponent

Organization name	DelAgua Health The Gambia (Voluntary) Limited
Contact person	Rory McDougall
Title	Commercial and Finance Director
Address	DelAgua Health The Gambia (Voluntary) Limited Poinciana House, West Mall & Poinciana Drive Freeport The Bahamas
Telephone	+22 09977211
Email	vcsprojects@delagua.org

Organization name	DelAgua Health Rwanda (Voluntary) Limited
Contact person	Rory McDougall
Title	Commercial and Finance Director
Address	c/o Cafferata & Co., Poinciana & West Mall Drove, Freeport, Grand Bahama, P.O. Box F-42614, Commonwealth of the Bahamas
Telephone	+250-790002992
Email	vcsprojects@delagua.org

1.7 Other Entities Involved in the Project

No other entities are involved in the project.

1.8 Ownership

DelAgua Health The Gambia (Voluntary) Limited is the owner of the VCS grouped project activity. During the distribution of the improved cookstoves, the participating households sign an end user agreement between ICS beneficiaries and DelAgua. The end user agreement has customer information, unique identification number, product details etc. The agreement follows the requirements of para 3.7.1 of the VCS Standard ver4.5 which states the evidence to establish project ownership should be “An enforceable and irrevocable agreement with the holder of the statutory, property or contractual right in the plant, equipment or process that generates GHG emission reductions and/or removals which vests project ownership in the project proponent.”

The agreement confirms that the ownership rights of the VERRA project and the carbon assets generated from this project lie with the project proponent. The customer under the End User Agreement “releases all rights to the greenhouse gas reductions and carbon credits produced by the use of the clean energy product in the favour of DelAgua and agree to not sell or transfer the GHG or carbon credits to any other third party or use these credits for any other purposes.

This will be evidenced through the below:

DelAgua has executed a Memorandum of Understanding with the Government of Gambia, whereby DelAgua is assigned responsibility for managing and implementing the project and is recognized as the sole direct recipient of all carbon credits derived from it.

Manufacturer agreements confirm that DelAgua is the sole owner of all technologies purchased under this project. These agreements further confirm the manufacturer's understanding that the carbon credits associated with use of the technologies shall be within the jurisdiction of DelAgua. During the distribution of the ICS, the participating household will sign an End User Agreement to confirm that the ownership rights of the carbon assets generated from this project lie with the project proponent.

1.9 Project Start Date

Project start date	23-February-2023
Justification	The start date is the commissioning of first ICS (project activity instance) under grouped project

1.10 Project Crediting Period

Crediting period	☒ Seven years, twice renewable ☐ Ten years, fixed ☐ Other (state the selected crediting period and justify how it conforms with the VCS Program requirements)
Start and end date of first or fixed crediting period	23-February-2023 to 22-February-2030

1.11 Project Scale and Estimated GHG Emission Reductions or Removals

- ☐ < 300,000 tCO₂e/year (project)
☒ ≥ 300,000 tCO₂e/year (large project)

Calendar year of crediting period	Estimated GHG emission reductions or removals (tCO ₂ e)
23-February-2023 to 31-December-2023	357,325
01-January-2024 to 31-December-2024	823,650
01-January-2025 to 31-December-2025	1,098,200
01-January-2026 to 31-December-2026	1,098,200
01-January-2027 to 31-December-2027	1,073,500
01-January-2028 to 31-December-2028	1,048,800
01-January-2029 to 31-December-2029	1,024,100
01-January-2030 to 22-February-2030	144,400
Total estimated ERRs during the first or fixed crediting period	6,668,175
Total number of years	7
Average annual ERRs	952,596

1.12 Description of the Project Activity

The project involves distribution of high thermal efficiency fuel-efficient improved cookstoves (ICS) to replace the baseline cookstoves at household level in The Gambia.

The project ICS will improve the efficiency of combustion and thermal transfer to the pot compared with a traditional pot support or three-stone fire. The reduction in the consumption of firewood from the usage of project ICS will result in the GHG emissions avoided compared with the pre-project scenario. This will be documented, monitored on periodic basis, and calculated for GHG emission reductions by applying a valid version of applicable methodology. The information on the methodology applied, and its applicable eligibility criteria are provided in Sections 3.1 & 3.2 of this PD respectively.

There are few models of ICS planned to be distributed under the GP. Two of the indicative models distributed / planned to be distributed under the GP are shown below:

Model of the stove	Kuniokoa Generation 2 with pot-skirt	Ecoa wood Generation 3
Stove manufacturer	Burn	Burn
Stove Type	Natural Draft	Natural Draft
Stove Body	Stainless Steel	Stainless Steel
Stove height	32.1 cm	28.5
Stove diameter	28.2 cm	26.9
Thermal efficiency (with pot skirt)	51.3%	52.0%
Thermal efficiency (without pot skirt)	43.4%	45.5%
High Power Output	2.9 kW	2.8 kW
Stove lifetime	10 years	10 years
Reference Picture		

Other models of improved cookstoves may also be offered under the GP as long as they meet all the requirements of the applied methodology.

With pot skirt, the level of retention of heat surrounding the pot will be higher, giving the ICS a higher thermal efficiency than using it without the pot skirt. Since the project ICS are being distributed with the pot skirt, the stove units have increased efficiency, thus reducing the firewood consumption to more than 50% than pre-project levels.

The project technology (ICS distributed under the GP) will achieve the equivalent or higher levels of performance by consuming firewood at a much lower rate than the existing technologies in use, which include the 3 stone fire, Furno and conventional stoves without any air vent, draft or chimney. The level of performance is being ensured by educating the local

population on the best usage practices for kitchen activities. All these activities will be taking place at a significantly lower smoke level. This will lead to improved health of the people, in terms of their respiratory health and the health of their eyes.

PP is collecting the necessary information to uniquely identify households and end users, thus creating a database of users (households) registered to be using project ICS within the GP crediting period. To allow a unique registration, each ICS is assigned a unique serial number, which can be tracked through the barcode on the ICS package box, and QR code on the stove body. This QR code label of unique serial number is mapped with the id of the household to which it is distributed. The distribution database will be maintained on a continuous basis and shall be revised for any updates. The unique ICS serial number will be recorded during the registration process together with the following information (wherever appropriate and available):

- Name of ICS user or head of the household
- Address / GPS of ICS household
- Phone number of ICS user or household, where available.
- Improved Cooking Stove model
- Date of distribution/installation
- ICS serial number

The distribution database will be maintained electronically and will be used towards monitoring.

1.13 Project Location

The project boundary is the geographic borders of The Gambia. The project boundary for each Project Activity Instance is the physical, geographical location of the ICS distributed within the geographical boundaries of The Gambia.

Also, each individual distribution under the project technology will record the geographical coordinates (i.e. lat/long data) or beneficiaries' household address, which can be later verified from the recorded data (monitoring surveys).

The KML file attached which indicate the geographical boundaries of the host country The Gambia and current PAI geographic area.



Figure 2: Project Location

The geo co-ordinates of the project location are 13.4432° N, 15.3101° W.

1.14 Conditions Prior to Project Initiation

The baseline scenario as per baseline study for VCS 4000 is the same as the conditions existing prior to the Grouped Project implementation. Within the baseline scenario, majority of households use firewood as the cooking fuel, and traditional/conventional cooking technologies to meet their kitchen needs. The traditional cooking technologies mainly include the 3 stone fire, and the cooking structures made without chimney, grate or flue gas ventilation.

For further information regarding this, please refer to Section 3.4 (Baseline Scenario) of this document.

1.15 Compliance with Laws, Statutes and Other Regulatory Frameworks

The Gambia government or laws do not have any regulations on the distribution of improved cookstoves to households within The Gambia.

1.16 Double Counting and Participation under Other GHG Programs

1.16.1 No Double Issuance

Is the project receiving or seeking credit for reductions and removals from a project activity under another GHG program?

☐ Yes ☒ No

1.16.2 Registration in Other GHG Programs

Has the project registered under any other GHG programs?

☐ Yes ☒ No

If yes, provide the registration number and the date of project inactivity under the other GHG program.

Is the project active under the other program?

☐ Yes ☒ No

1.16.3 Projects Rejected by Other GHG Programs

Has the project been rejected by any other GHG programs?

☐ Yes ☒ No

1.17 Double Claiming, Other Forms of Credit, and Scope 3 Emissions

1.17.1 No Double Claiming with Emissions Trading Programs or Binding Emission Limits

Are project reductions and removals or project activities also included in an emissions trading program or binding emission limit? See the *VCS Program Definitions* for definitions of emissions trading program and binding emission limit.

☐ Yes ☒ No

1.17.2 No Double Claiming with Other Forms of Environmental Credit

Has the project activity sought, received, or is planning to receive credit from another GHG-related environmental credit system? See the *VCS Program Definitions* for definition of GHG-related environmental credit system.

☐ Yes ☒ No

1.17.3 Supply Chain (Scope 3) Emissions

Do the project activities specified in Section 0 affect the emissions footprint of any product(s) (goods or services) that are part of a supply chain?

☐ Yes ☒ No

If yes:

Is the project proponent(s) or authorized representative a buyer or seller of the product(s) (goods or services) that are part of a supply chain?

☐ Yes ☐ No

If yes:

Has the project proponent(s) or authorized representative posted a public statement on their website saying, "Carbon credits may be issued through Verified Carbon Standard project [project ID] for the greenhouse gas emission reductions or removals associated with [project proponent or authorized representative organization name(s)] [name of product(s) whose emissions footprint is changed by the project activities]."

☐ Yes ☐ No

1.18 Sustainable Development Contributions

Following sustainable contributions are expected to be associated with the distribution of ICS in The Gambia:

The project activity will reduce the indoor air pollution levels to a significant level, thereby reducing the risks people face with the 3 stone fires or the traditional cooking devices. The number of deaths among children per year accounted to the indoor household air pollution is high in The Gambia, and lack of quality health interventions at local level increase the risk further. The lower respiratory disease risk and improved indoor air quality will reduce the mortality rates caused due to it.

Women in The Gambia spend a significant amount of time every day to collect firewood. While using ICS, the less amount of fuel used for kitchen activities means that they must spend less time in the field collecting wood. This time saved by the women can now be used towards better management of household, or can be used towards any livelihood or income generating activity, e.g. farming, poultry, animal products, etc.

The project activity aims to distribute ICS to the individual households in the country The Gambia at free of cost, and this will reduce their reliance on the firewood fuel usage. The project ICS models claim to reduce fuel usage by more than 50% than their baseline consumption. This will save a significant amount of firewood fuel usage per household on daily basis, which consequently will allow them to lead a healthy and less worried life.

The project activity will be providing indirect employment to the distribution team and provides them with per diem for their services. These contractual workers will support the distribution and will act as the point of program's connectivity with the households. The project activity maintains permanent staff working from the management office located in the capital city of Gambia i.e., Banjul. Both contractual staff and permanent staff will be increased, based on the program's success. The workforce will be trained from time to time, in order to meet the requirements of the monitoring data recorded at the time of project ICS distribution.

The GHG emissions caused by the burning of firewood will be reduced by the usage of project ICS. The reduction in the firewood consumption compared with the baseline levels provide the amount of GHGs avoided, by application of VCS methodology VM 0050, ver. 1.0. Following sustainable contributions are part of the PAIs (Distribution of ICS in The Gambia):

1. SDG-1: No Poverty

Approach: For arriving at the indicator value, PD will monitor the relevant parameter for this SDG.

Relevant SDG Indicator: 1.4.1 Proportion of population living in households with access to basic services

Available Data: The parameter monitored to calculate the number of HHs living without access to basic services is the number of beneficiary HHs. This is because the number of HHs that are unable to purchase any improved cooking devices can be considered as the ones living without access to the basic services such as clean cooking.

Monitoring Requirement(s): The new project ICS beneficiary/user are considered as living without the access to clean cooking, and the final value of number of such people using the project ICS will be considered towards the estimation of this SDG impact. Clean cooking is considered as a basic service, and access to it is an addition to the SDG impact.

2. SDG-3: Good Health and Well Being:

Approach: For arriving at the indicator value, PD will monitor the relevant parameter for this SDG, specifically the SDG indicator. This SDG relates to health, and DelAgua's project ICS is improving health for every individual who is receiving it.

Relevant SDG Indicator: 3.9.1 Mortality rate attributed to household and ambient air pollution

Available Data: Regarding indicator 3.9.1, at every project ICS beneficiary HHs, ones who are experiencing any improvement (or no improvement or deterioration) in their ambient air quality as compared to pre-project scenario will be considered as an input.

Monitoring Requirement(s): The data will be collected at the time of monitoring survey. Beneficiary HHs for VCS GP will be sampled for monitoring as per monitoring plan, and these are then requested to respond to survey questions, which will then be recorded within the monitoring survey database.

3. SDG-5: Gender Equality

Approach: In this case, the number of ICS beneficiary HHs will be questioned over their time spent for collecting fuel (firewood).

Relevant SDG Indicator: 5.4.1 Proportion of time spent on unpaid domestic and care work, by sex, age and location

Available Data: Monitoring Survey for VCS GP includes question on time spent on collection of fuel.

Monitoring Requirement(s): The value is recorded in the monitoring surveys and then saved in the survey database.

4. SDG-7: Affordable and Clean Energy

Approach: For arriving at the indicator value, PD will monitor the relevant parameter for this SDG, specifically the SDG indicator.

Relevant SDG Indicator: 7.1.2 Proportion of population with primary reliance on clean fuels and technology

Available Data:

Distribution Master Database includes the data for this, where each HH where project ICS is distributed, acts as an input. The data within the database is updated on a continuous basis.

Monitoring Requirement(s): Distribution Database is exported for the monitoring period, and then the number of beneficiaries HHs are multiplied with the average HH size of Gambia. This gives the number of people who are now benefiting from the clean and affordable energy for the Monitoring Period.

5. SDG-8: Decent Work and Economic Growth

Approach: For arriving at the indicator value, PD will monitor the relevant parameter for this SDG, specifically the SDG indicator.

Relevant SDG Indicator: 8.3.1 Proportion of informal employment in total employment, by sector and sex

Available Data: The implementation of the project will lead to generation of permanent employment/ temporary employment/ community-based employment during distribution.

Monitoring Requirement(s): This data is continuously collected and is obtained from Training and Account teams.

6. SDG-12: Ensure Sustainable consumption and production pattern

Approach: Here, each household is trained for sustainable practices, best usage practices for ICS usage, and utilization of fuel resources.

Relevant SDG Indicator: 12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature

Available Data:

Number of project ICS beneficiary HHs who will be visited by DelAgua staff for HH visit surveys are used to calculate the parameter. This data is continuously recorded in the distribution master database

Monitoring Requirement(s): The distribution master database is used to calculate the number of people trained under the project activity.

7. SDG-13: Climate Action

Approach: For this SDG, there are no separate monitoring requirements. PD will declare the GHG Emission Reductions achieved by project in the monitoring period. This is verified by a VCS accredited VVB, and the resultant VCUs are then issued, acting as the net impact contributed towards this SDG.

Relevant SDG Indicator: Not applicable.

Available Data: This can be accessed from the Monitoring Reports that are publicly available.

Monitoring Requirement(s): All the monitoring requirements will be detailed in the Monitoring Reports and corresponding ER Sheets.

1.19 Additional Information Relevant to the Project

1.19.1 Leakage Management

Not applicable as the project adopts a net gross adjustment factor of 95% to account for leakage.

1.19.2 Commercially Sensitive Information

No commercially sensitive information has been excluded from the public version of the project description.

1.19.3 Further Information

Not Applicable.

2 SAFEGUARDS AND STAKEHOLDER ENGAGEMENT

2.1 Stakeholder Engagement and Consultation

2.1.1 Stakeholder Identification

Stakeholder Identification	The primary stakeholders for the project are the recipients of the improved cookstoves i.e. rural households across the Gambia. Other stakeholders include project staff employed by DelAgua and the Ministry of Petroleum and Energy, which is responsible for promoting clean cooking within the Gambia.
Legal or customary tenure/access rights	As the project is not a land use project, there are no legal or customary tenure issues or access rights that are impacted by the project.
Stakeholder diversity and changes over time	The primary stakeholders in the project are rural households across the Gambia. No expected change has happened to the stakeholders' makeup.
Expected changes in well-being	Household air pollution (HAP) due to use of inefficient cookstoves is well documented to cause long-term ailments and deaths across the world. Distribution of efficient cookstoves would reduce release of harmful pollutants. Also, since these cookstoves consume less fuelwood, women would spend less time in collecting fuelwood and in cooking meals. Thus, they could devote more time to other productive work, leisure or childcare.
Location of stakeholders	Primary stakeholders i.e. project beneficiaries are all located in rural communities across the Gambia. The project staff is too located in the rural Gambia. Ministry of Petroleum and Energy of the Government of the Gambia is housed in Banjul, the capital city of the Gambia.
Location of resources	As this is not a land use project, this is not applicable.

2.1.2 Stakeholder Consultation and Ongoing Communication

Date of stakeholder consultation	21-November-2022
Stakeholder engagement process	Before the meeting identified stakeholders were informed by press release published in the newspaper "The Standard Times" which is a well-read newspaper in the country. dated 15th November 2022 and email to identified stakeholder dated 04th

	November 2022. Also, the identified stakeholders were invited by posters in public places (also accessible to women) and other means to join the meet. The comments were invited in an open and transparent manner in the physical meeting by facilitating with a presentation on the proposed project activity.
Consultation outcome	The agenda of the meeting was to showcase the VCS grouped project being implemented and invite local stakeholders to understand about the project, submit their grievances, and raise their concerns, wherever required. Below are the steps followed during stakeholder consultation meeting 1. The meeting started with presentation on grouped project activity and associated benefits to society, ecology and economic aspect due to use of improved cookstoves. 2. The sample cookstove unit to be distributed under VCS 4000 implementation (Burn Kuniokoa), was demonstrated to the local stakeholders present for its usage. 3. During the meeting, stakeholders were invited to raise their queries and concerns. These were duly responded to during the meeting itself. During local stakeholder consultation held in 2022, participants raised some queries. PP responded to those queries satisfactorily. The queries pertained to whether the project would generate local employment, to which the PP replied affirmative. Other Q&As are summarized: Q.1. Which districts/region the project is planned under the current project activity? Ans: The PP representative explained that the project boundary for the grouped project activity is host country The Gambia and all the districts will be covered. Q.2. What will be the price of ICS to the end users. Ans: The ICS will be distributed free of cost, the beneficiary need to comply with usage norms and monitoring requirement. Q.3. Whether only one stove per household will be provided or more? Ans: Initially one stove per household is planned to be given, however in future the same may be assessed. Q.4. Whether the project will be complying with local regulations? Ans: The DelAgua has informed government about the project activity, as the project will import ICS from other part of Africa, hence there will be no manufacturing unit.
Ongoing communication	DelAgua email id: DelAgua email is the main source of connection through which the stakeholders can connect with

	DelAgua. All contacts with government, and operational partners are done via the email ID : TheGambia@delagua.org Through Village Development Committees: DelAgua builds upon existing rural networks to distribute, monitor and educate on stove use. These networks also play a critical role in ensuring strong feedback mechanisms are in place. VDC members are part of communities where stoves have been distributed. They are personally known to all stove recipients. As part of their training, they are directed on ensuring feedback about the programme, and grievances raised are quickly and accurately communicated to full time DelAgua staff – who submit grievances via an online form. This form of on-going communication is critical in rural areas where individuals may lack access to phone or email. Grievance Logbook : A grievance logbook is maintained at the local office in Banjul, The Gambia and reviewed monthly to address concerns raised. Apart from the mechanism available for local stakeholders connecting with the DelAgua, the follow-up visits by the DelAgua staff are also undertaken to user households.
Stakeholder input	The PP has not received any feedback or inputs from the stakeholders during the on-going communication. Nor, the PP received any negative comments during local stakeholder consultation. No comment warrants change in project design.

2.1.3 Free Prior and Informed Consent

Obtaining consent	Prior to commencing the project, DelAgua signed a Memorandum of Understanding with Ministry of Petroleum and Energy to distribute improved cookstoves to rural households across the Gambia. Following this, DelAgua has signed Collaboration Agreements with the Regional Governors that the project has been delivered in (to date.) These agreements help the population in protecting the environment by scaling down firewood consumption while reducing indoor air pollution leading to improved respiratory health. Finally, Primary stakeholders have been approached to ask if they wish to sign up to receive a free improved cookstoves.
Outcome of FPIC	The outcomes of the ways in which consent was sought is that DelAgua operates under an MoU with the Government of the Gambia (through the Ministry of Petroleum and Energy) that ensures we are operating with government approval and requires us to regularly report to government. With the primary

stakeholders, we have ensured that every individual stakeholder is able to give their consent to take part in the project.

2.1.4 Grievance Redress Procedure

Development process

DelAgua generated its grievance redress procedure through the utilisation of frameworks it had already tested and utilised in other sub-Saharan African contexts. We took these foundations and asked our local team to adapt to the local context before sense checking with government stakeholders.

We then field tested the process within our pilot period, before iterating and rolling out for the wider project.

The key stakeholder in this process are the village development committees, outlined below, but we also ensure dedicated resource within the DelAgua team was allocated to the GRM.

Grievances are able to be raised to all local beneficiaries through the trust and social bond system tapped into through the use of these VDCs. Grievances are quickly reported to DelAgua staff, where they are allocated a dedicated lead, dependant on their topic and that lead has clearly laid out timelines in which to respond.

As grievances come up through local contacts, they are managed in cultural appropriate ways, with communication channels being at the benefit of the grievance raiser.

Grievance redress procedure

DelAgua email id: DelAgua email is the main source of connection through which the stakeholders can connect with DelAgua. All contacts with government, and operational partners are done via the email ID : TheGambia@delagua.org

Through Village Development Committees: DelAgua builds upon existing rural networks to distribute, monitor and educate on stove use. These networks also play a critical role in ensuring strong feedback mechanisms are in place. VDC members are part of communities where stoves have been distributed. They are personally known to all stove recipients. As part of their training, they are directed on ensuring feedback about the programme, and grievances raised are quickly and accurately communicated to full time DelAgua staff – who submit grievances via an online form. This form of on-going communication is critical in rural areas where individuals may lack access to phone or email.

Grievance Logbook : A grievance logbook is maintained at the local office in Banjul, The Gambia and reviewed monthly to address concerns raised.

Apart from the mechanism available for local stakeholders connecting with the DelAgua, the follow-up visits by the DelAgua staff are also undertaken to user households.

2.1.5 Public Comments

Comments received	Actions taken
No comments received	Not applicable as none was received during the 30 days listing period on VERRA registry. The VCS PD was made available for the public comments from 03 January 2023 to 02 February 2023

2.2 Risks to Stakeholders and the Environment

2.2.1 Management Experience

PP's extensive experience in implementing clean energy projects and engaging communities, particularly in the distribution of improved cookstoves and solar solutions to underserved populations since 2004. The company has a strong track record in delivering energy access projects, ensuring effective community engagement, and maintaining high implementation standards.

No new entities have been included in the design or implementation of the project, and PP's expertise remains sufficient to effectively manage the project.

2.2.2 Risk Assessment

	Risks identified	Mitigation or preventative measure(s) taken
Natural and human-induced risks to stakeholders' wellbeing	No risk identified	These ICS are manufactured with safety protocols as per standardized design and material specifications to ensure proper functioning and user protection. The transition to project ICS from traditional cooking technology offers a sustainable and safe alternative to meeting the energy demand, enhancing environmental and health benefits without introducing new risks.
Risks to stakeholder participation	No risk identified	Before the meeting identified stakeholders were informed by press release published in the newspaper "The Standard Times" which is a well-read newspaper in the country. dated 15th November 2022 and email to identified stakeholder dated 04th November 2022. Also,

		the identified stakeholders were invited by posters and other means to join the meet. The comments were invited in an open and transparent manner in the physical meeting by facilitating with a presentation on the proposed project activity.
Working conditions	DelAgua staff at risk from working in remote locations	DelAgua maintains a health, safety & security policy for all staff in the Gambia. In addition, DelAgua maintains a risk register (as part of an overall risk management policy) that tracks all risk types (in addition to safety and security.) This is updated on a quarterly basis.
Safety of women and girls	Women and girls are exploited as a result of participating in the project. No risk identified for project beneficiaries.	DelAgua ensures all staff follow a clear Code of Conduct that they sign up to upon recruitment. This policy is regularly updated and enforced. With regard to project beneficiaries, on contrary, it reduces instances of collecting wood, thereby reducing vulnerability to wildlife or to potential criminal eventualities.
Safety of minority and marginalized groups, including children	Children are recruited to deliver the project. No risk identified for project beneficiaries.	DelAgua maintains a policy on child labor which all staff, suppliers and vendors are required to adhere to. This policy is regularly updated and enforced. With regard to project beneficiaries, on contrary, it reduces the exposure to smoke production during cooking meals, when children are in the vicinity of their mothers during cooking.
Pollutants (air, noise, discharges to water, generation of waste, and release of hazardous materials and chemical pesticides and fertilizers)	No risk identified for both staff and project beneficiaries	N/A, the project does not involve the manufacture, trade, release, and/ or use of hazardous and non-hazardous materials. With regard to project beneficiaries, on contrary, the project activity aims to reduce smoke produced during cooking, with the help of improved design of the project stove.

2.3 Respect for Human Rights and Equity

2.3.1 Labor and Work

Risks identified		Mitigation or preventative measure(s) taken
Discrimination	No risk identified	DelAgua maintains several HR policies for staff as well as a safeguarding policy for beneficiaries. These policies are maintained, monitored and implemented by DelAgua's HR unit.
Sexual harassment	No risk identified	DelAgua maintains several HR policies for staff as well as a safeguarding policy for beneficiaries. These policies are maintained, monitored and implemented by DelAgua's HR unit.
Equal pay for equal work	No risk identified	PPs do not discriminate based on gender and promote equal work for equal pay. PP further confirms that the average wages / remunerations paid to the employees working with PPs is at / above par with the industry standards and in compliance with the minimum wage rate prescribed by the state / local government regulations.
Gender equity in labor and work	No risk identified	Please refer above
Forced labor	No risk identified	The PPs neither endorse nor is involved in child labor, the exploitation of human trafficking victims, or the utilization of forced labor. PPs have relevant policies to make sure that no such workplace risks exist.
Child labor	No risk identified	Please refer above
Human trafficking	No risk identified	Please refer above

2.3.2 Human Rights

Risks identified	Mitigation or preventative measure(s) taken
No risk identified	The project involves the distribution of improved cookstoves to individual households and is not a land use project. Therefore, in this context, there are no legal or customary tenure/access rights to territories and resources, including collective and conflicting rights held by stakeholders, indigenous people (IPs), local communities (LCs), or customary rights holders. The primary stakeholders are given the opportunity to provide their details if they wish

to receive a free improved cookstove. It is entirely their choice whether to sign up or to decline. Once they have signed up, stoves are distributed irrespective of tribal, ethnic, religious or political backgrounds of the beneficiaries. Beneficiaries are not subjected to forced or coerced to use the stoves during ongoing monitoring work.

2.3.3 Indigenous Peoples and Cultural Heritage

Risks identified	Mitigation(s) or preventative measure taken
No risk identified	Not applicable. The project involves distribution of improved cookstoves to households in the Gambia and does not affect the cultural heritage sites. Primary stakeholders are invited to give their name during the beneficiary data collection progress if they wish to receive an improved cookstove. They are not compelled to do so, nor are they told to change their traditional practices beyond being encouraged to use their improved cookstove for future cooking events.

2.3.4 Property Rights

Risks identified	Mitigation or preventative measure(s) taken
No risk identified	N/A. The project does not impact any IP, LC or any other customary rights involving resources, territories or properties. The distribution and use of Improved Cookstoves (ICSs) do not interfere with the property rights, legal or customary tenure, or access rights of Indigenous Peoples (IPs), Local Communities (LCs), or customary rights holders. The ICSs are fully portable and do not require land acquisition, displacement, or modifications to communal or individually held territories, properties, or resources. Additionally, the project does not impose any restrictions on customary land use or access to natural resources. As the adoption of ICSs is entirely voluntary, stakeholders retain full autonomy in their decision-making, ensuring no infringement on collective or conflicting tenure rights. The project aligns with

applicable legal frameworks and customary norms, supporting sustainable development without disrupting existing rights or claims.

2.3.5 Benefit Sharing

This section is not applicable, as the project does not impact the property rights of individuals.

Process used to design the benefit sharing plan	N/A
Summary of the benefit sharing plan	N/A
Approval and dissemination of benefit sharing plan	N/A

2.4 Ecosystem Health

	Risks identified	Mitigation or preventative measure(s) taken
Impacts on biodiversity and ecosystems	No risk identified	The ICS reduces GHG emissions through its better design and improved performance as compared to traditional stove, without changing the baseline fuel or introducing additional pollutants. Therefore, the project has no impact on biodiversity and ecosystems.
Soil degradation and soil erosion	No risk identified	The project stoves directly decrease wood fuel demand and reduce the pressure from wood cutting within the project boundary. Thus, project activity will indirectly avoid erosion associated with tree cutting/ felling
Water consumption and stress	No risk identified	The project activity which is the distribution of improved cookstoves in the Gambian households, does not affect water consumption patterns in the localities. Therefore, no risk identified.

2.4.1 Rare, Threatened, and Endangered Species

Is the project located in or adjacent to habitats for rare, threatened, or endangered species?

☐ Yes ☒ No

Does not require further assessment, as the project is not located in or adjacent to habitats for rare, threatened, or endangered species.

2.4.2 Introduction of Species

N/A. This section is not applicable to this grouped project as it does not involve planting and/or species introduction.

2.4.3 Ecosystem Conversion

This section is not applicable, as the grouped project does not belong to the categories of ARR, ALM, WRC or ACoGS.

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

Type (methodology, tool or module).	Reference ID, if applicable	Title	Version
Methodology	VM0050	Energy Efficiency and Fuel-Switch Measures in Cookstoves https://verra.org/wp-content/uploads/2024/10/VM0050-EE-and-Fuel-Switch-Measures-in-Cookstoves-v1.0.pdf	1.0
Tool	Tool 30	CDM TOOL30 “Calculation of the fraction of non-renewable biomass” https://cdm.unfccc.int/methodologies/PA/methodologies/tools/am-tool-30-v4.0.pdf	04.0
Protocol	KPT	Kitchen Performance Test (KPT) https://cleancooking.org/binary-data/DOCUMENT/file/000/000/604-1.pdf	4.0
Protocol	WBT	Water Boiling Test Protocol https://cleancooking.org/binary-data/DOCUMENT/file/000/000/399-1.pdf	4.2.3
Clarification/corrections	-	CORRECTION AND CLARIFICATIONS TO VM0050 ENERGY EFFICIENCY AND FUEL SWITCH MEASURES IN COOKSTOVES, V1.0	

		Dated: 03 February 2025 https://verra.org/wp-content/uploads/2025/02/CC_VM0050_v1.0_Feb2025.pdf	
Guideline	CDM Guideline	CDM Guideline “Sampling and surveys of CDM project activities and programmes of activities”	04.0
Standard	CDM Standard	CDM Standard “Sampling and surveys for CDM project activities and programmes of activities”	09.0

3.2 Applicability of Methodology

The applicability criteria of the methodologies and tools used are justified at the project activity level. This is reflected in the table below.

The applicability of methodology VM0050 is justified as below:

Methodology ID	Applicability condition	Justification of compliance
VM0050	Replacement of non-renewable biomass (e.g., firewood, charcoal)-fired cookstoves with: i. More efficient project devices that use the same fuel as in the baseline. ii. Efficient project devices fired by renewable biomass or bioethanol. iii. Efficient project devices fired by liquefied petroleum gas (LPG); or Electric-powered project devices.	The project replaces non-renewable biomass-fired traditional cookstoves with more efficient improved cookstoves (ICSs). All ICSs distributed or planned to be distributed under the project have a thermal efficiency significantly higher than the baseline traditional cookstoves.
VM0050	Replacement of solid or liquid fossil fuel (e.g., coal, kerosene)-fired cookstoves with any of the following: i. Efficient project devices fired by renewable biomass or bioethanol ii. Efficient project devices fired by LPG; or iii. Electric-powered project devices.	Not applicable, since the ICSs involved in the project replaces traditional biomass-fueled cookstoves rather than solid or liquid fossil fuel-fired cookstoves. The project focuses on improving the efficiency of biomass-based cooking rather than transitioning from fossil fuel use.
VM0050	Project devices are used in households, communities, institutions, or small or	All ICSs involved in the project are used in domestic premises, i.e., households

	medium enterprises (SMEs), ⁴ collectively referred to in this methodology as the “target population.	and communities. As the project devices are exclusively deployed within households for daily cooking activities, the project aligns with the definition of the “target population” as specified in the methodology.
VM0050	Where renewable biomass is used, it is exclusively renewable and qualifies as one of the following: a) A by-product, residue, or waste stream from agriculture, forestry, and related industries; or b) Originating from dedicated plantations that comply with all relevant applicability conditions in the most recent version of CDM TOOL16.	Not applicable, since the ICSs involved in the project replace traditional biomass-fueled cookstoves with more efficient devices. The project does not involve the use of renewable biomass as a fuel source but rather focuses on reducing biomass consumption through improved efficiency.
VM0050	Where biomass residues are used, they would have been left to decay or burned without energy recovery before implementation of the project activity, and their use does not involve a decrease in carbon pools – in particular of dead wood, litter, or soil organic carbon – on the land areas from which the biomass residues originate.	Not applicable, since the ICSs involved in the project do not use biomass residues as a fuel source. Instead, the project focuses on improving the efficiency of biomass consumption in traditional cooking practices, thereby reducing overall fuel demand rather than introducing new biomass sources.
VM0050	Where biomass residues from a production process are used, project implementation does not result in an increase in the processing capacity of raw input or any other substantial changes (e.g., product change) in this process.	Not applicable, since the ICSs involved in the project do not use biomass residues as a fuel source. Instead, the project focuses on improving the efficiency of biomass consumption in traditional cooking practices, thereby reducing overall fuel demand rather than introducing new biomass sources.
VM0050	The project does not use multiple types of renewable biomass as a fuel source but instead improves the efficiency of existing biomass use, reducing overall fuel consumption.	The project does not use multiple types of renewable biomass as a fuel source but instead improves the efficiency of existing biomass use, reducing overall fuel consumption.
VM0050	Where project activities introduce renewable biomass as charcoal, it is renewable charcoal produced by efficient charcoal production processes ⁶ (e.g., retort sedentary) kilns, improved sedentary kilns,	Not applicable, The project does not introduce renewable biomass as charcoal but instead focuses on improving the efficiency of biomass consumption in traditional cooking

	Casamance kilns). Methane produced during the charcoaling process is captured and destroyed or combusted for energy purposes.	practices, reducing overall fuel demand.
VM0050	Project devices using renewable biomass (fuel-switch) or non-renewable biomass (improved efficiency) are single-pot, multi-pot portable, or in-situ cookstoves with an initial thermal efficiency of at least 25%	All ICSs involved in the project are portable cookstoves with an initial thermal efficiency of more than the minimum requirement of 25%. This ensures improved fuel efficiency and compliance with the applicability condition.
VM0050	Project devices using LPG or bioethanol are single-pot, multi-pot portable, or in-situ cookstoves with an initial thermal efficiency of at least 30%	Not applicable, the project does not involve the use of LPG or bioethanol cookstoves. It focuses on the distribution of improved biomass cookstoves.
VM0050	Electric project devices meet the maximum risk factor score of 15 on the Cookstove Durability Protocol and have the following minimum thermal efficiency: a) Hot plates and electric hobs: 40% b) Induction stoves and other electric stoves: 70%	Not applicable, the project does not involve electric cookstoves. It focuses on the distribution of improved biomass cookstoves.
VM0050	Project devices using LPG comply with all of the following conditions: a) The baseline fuel either includes non-renewable biomass or is a more carbon intensive fossil fuel (demonstrated by the baseline survey, see Section 6.2) b) The project has a provision for metering LPG supplied to each consumer at the LPG filling station, in order to determine household LPG consumption; and c) The project does not seek to issue any carbon credits for periods after 31 December 2045.	Not applicable, the project does not involve LPG cookstoves. It focuses on the distribution of improved biomass cookstoves.
VM0050	Electric project devices use the following electricity sources: a) Decentralized renewable energy systems: Decentralized	Not applicable, the project does not involve electric cookstoves. It focuses on the distribution of improved biomass cookstoves.

	energy systems using fossil fuels are not eligible, except for backup generators that supply less than 1% of the annual electricity of the decentralized renewable energy system. b) Self-generated renewable electricity (with a maximum of 20% electricity from non-renewable sources for backup); or c) National or regional electricity grid.	
VM0050	The project proponent designs incentive mechanisms to reduce the use of inefficient baseline devices and practices that can be replaced by the project devices and describes these mechanisms in the project description.	The project proponent has designed incentive mechanisms to eliminate the use of inefficient baseline cookstoves by distributing improved cookstoves (ICSs) free of cost to beneficiaries. Additionally, awareness programs and community engagement initiatives are in place to ensure sustained adoption. These mechanisms are detailed in the project description.
VM0050	Where a project device has ended its technical life, the project proponent either replaces it with a comparable or better project device or retrofits its essential components to continue meeting the minimum service level requirements (i.e., thermal energy generation), otherwise no further emission reductions may be claimed for the project device.	The project proponent ensures that once a project cookstove reaches the end of its technical life, it is either replaced with a comparable or better stove or retrofitted to maintain its functionality and efficiency. Otherwise, emission reductions from that cookstove will no longer be claimed.
VM0050	Project proponents implement a method for the distribution and identification of project devices that avoids double counting of emission reductions by other mitigation actions and includes unique product identification on the stove itself at the time of distribution/sale (e.g., program logo, alpha/numeric ID, and end-user location, such as geographic coordinates, complete address information).	The PP ensures that each distributed improved cookstove (ICS) is uniquely identified to avoid double counting of emission reductions. Each stove is marked with a program logo and assigned a unique identification number at the time of distribution. Additionally, a sales database will be maintained, recording end-user details, including geographic coordinates or address information, to ensure no double counting.

VM0050	The project complies with any national, sub-national, or local regulations or guidance for the installation, commercialization, distribution, and use of improved cookstoves and/or fuel supply and use for the target population. National, regional, and local regulatory frameworks for the provision of the type of thermal energy services provided by the project activity must be documented.	A review of the national energy policies of the Gambia shows that there are no mandatory laws, policies or requirements mandating the use of ICS.
VM0050	Where project activities reduce emissions from non-renewable biomass, including firewood and charcoal, the risk of double counting is assessed on a national basis by evaluating at validation and crediting period renewal whether there are REDD+ projects or jurisdictional REDD+ programs whose project boundary overlaps with the expected fuel source area of the project. The project proponent must report on the findings of this assessment for informational purposes in the project description.	The Gambia currently hosts one registered REDD+ project (VCS 3223⁴ registered on 29 Jan 2025) under Verra's program. Although the project is registered, no VCUs have been issued for this REDD+ project till date. Furthermore, the REDD+ project is not focused on the avoidance of deforestation. Instead, it is based on ARR activities involving mangrove tree planting, as well as wetland ecosystem restoration (RWE). Additionally, the VCS 3223 registered VCS-PD, confirms the following: a) On page 96, <i>"In VM0007v1.6, it is furthermore stated that where applicable, leakage due to market effects must be considered using module LK-ME, and that unsustainable fuelwood collection must be considered using module BL-DFW and LK-DFW. However, as no anthropogenic activities were present pre-project in PAI#1, such leakage analyses are not applicable to PAI#1."</i> b) On page 114, section 5.1 Data and Parameters available at validation, the value of parameter "Net greenhouse gas emissions in the baseline from degradation caused

⁴ <https://registry.terra.org/app/projectDetail/VCS/3223>

		by fuelwood collection and charcoal making” has been validated and approved as 0 The aforesaid, thus confirms that the presence of VCS 3223 in the similar area as that of this project, does not result in double counting of emission reductions being mutually exclusive as explained above.
--	--	---

Tool 30 - Calculation of the fraction of non-renewable biomass

Tool 30	This tool may be used by: (a) DNAs to submit region- or country-specific default fNRB values, following the procedures for development, revision, clarification and update of standardized baselines (SB procedures); or (b) project participants to calculate project- or PoA-specific fNRB values.	Option (b) applied to calculate the project specific fNRB value as described under in the separate fNRB spreadsheet submitted to VVB
Tool 30	Project participants and DNAs shall identify and clearly delineate the applicable area for which fNRB is determined. For project- or PoA-specific fNRB values, project participants shall assess and use the area from which woody biomass is sourced for end-users included in the project activity and justify the selection of the area in CDM project design documents. For region- or country-specific fNRB values, DNAs shall specify the applicable area.	The PP has chosen host country The Gambia as region for the grouped project activity.
	Project participants and DNAs may choose between the following two options to	The PP has chosen option b), wherein a third-party

	determine the value of fNRB: (a) Use the default value as provided in TOOL33; or (b) Calculate fNRB by determining the share of renewable and non-renewable woody biomass in the total quantity of woody biomass consumption for the country/region or the project area (hereinafter referred as the applicable area) following the procedure and requirements in the paragraphs below. The project participants shall compare and analyse the calculated values against the values for fNRB reported in relevant scientific literature and justify any differences. This analysis shall be included in the appropriate section of the PDD. The relevant scientific literature should include at least: (i) Bailis, R.; Drigo, R.; Ghilardi, A. & Masera, O. (2015). The carbon footprint of traditional woodfuels. <i>Nature Climate Change</i>, 5(3), pp. 266–272.	consultant has established the fNRB for host country. Please refer Appendix for calculation details and comparison with literature.
--	--	--

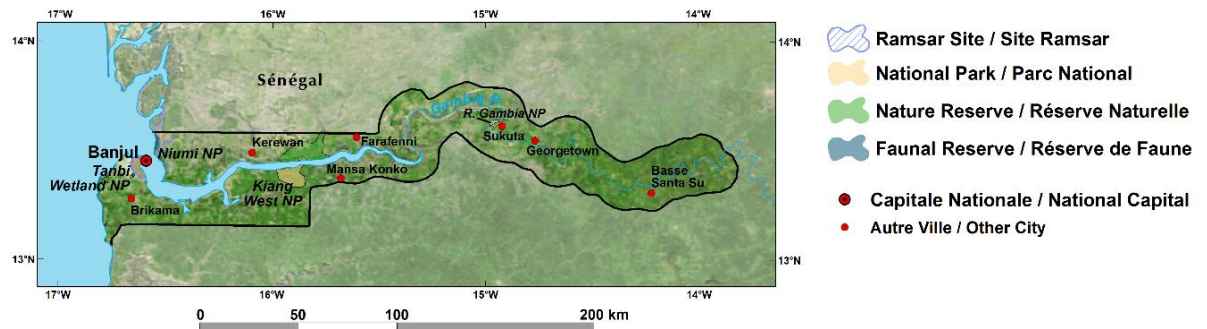
3.3 Project Boundary

As per the applied methodology VM0050, the project boundary is the geographical location of all the solid biomass project devices and the locations from which baseline and project fuels are sourced. As the activity involves distribution of ICS (Improved Cookstove) and fuel sourcing from throughout Gambia, the project boundary is the physical, geographical location Gambia.

Source		Gas	Included?	Justification/Explanation
Baseline	Thermal energy generation	CO ₂	Yes	Major source
		CH ₄	Yes	Major source
		N ₂ O	Yes	Major source

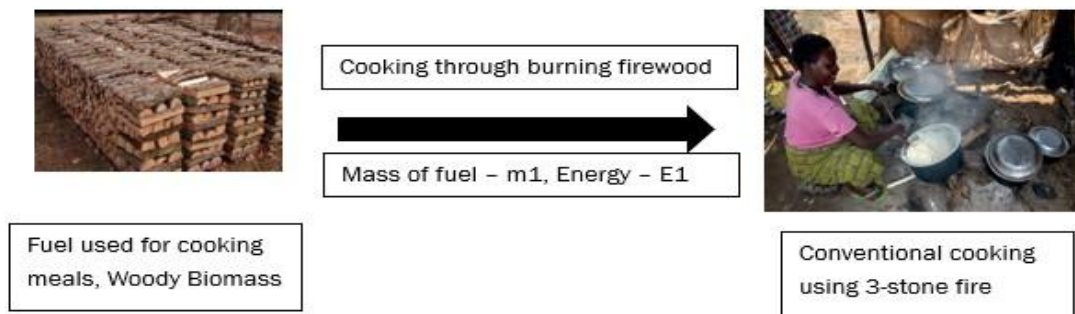
Source		Gas	Included?	Justification/Explanation
Project	Production of charcoal fuel	CO ₂	Yes	Not applicable, the project does not involve charcoal. It focuses on the distribution of improved wood cookstoves.
		CH ₄	Yes	
		N ₂ O	Yes	
	Thermal energy generation	CO ₂	Yes	Major source
		CH ₄	Yes	Major source
		N ₂ O	Yes	Major source
	Transport of fuel (where applicable)	CO ₂	No	In the baseline scenario, households rely on inefficient traditional cookstoves, leading to higher fuel consumption and more frequent trips for fuel collection or purchase. This results in greater emissions from transportation due to the increased demand for fuel distribution. In contrast, the project scenario introduces more efficient improved cookstoves (ICSs), which significantly reduce fuel consumption. With lower fuel demand, there are fewer trips needed for fuel transportation, leading to lower emissions from fuel production and transport. Since emissions are higher in the baseline than in the project scenario, they can be ignored as per section 5 of the methodology.
		CH ₄	No	
		N ₂ O	No	
	Production of fuel (where applicable)	CO ₂	Yes	Not applicable, the project does not involve charcoal. It focuses on the distribution of improved wood cookstoves.
		CH ₄	Yes	
		N ₂ O	Yes	
	Self-generated electricity (non renewable energy for backup)	CO ₂	No	Not applicable, the project does not involve electric cookstoves. It focuses on the distribution of improved biomass cookstoves.
		CH ₄	No	
		N ₂ O	No	
	Grid electricity generation and distribution	CO ₂	No	Not applicable, the project does not involve electric cookstoves. It focuses on the distribution of improved biomass cookstoves.
		CH ₄	No	
		N ₂ O	No	

Figure 3: Project boundary map⁵ showing physical locations of the Host country, where Grouped Project distribution is planned

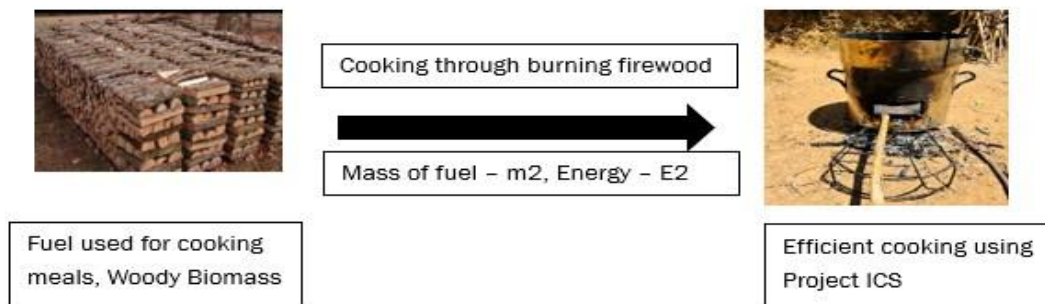


Flow of mass and energy in the project activity:

Baseline Scenario:



Project Scenario:



Here, the change in mass of firewood between baseline and project scenario is $m1 > m2$.

The change in energy consumed for kitchen activities between baseline and project scenario is $E1 < E2$.

⁵ Source: USGS; URL: <https://eros.usgs.gov/westafrika/country/republic-gambia>

3.4 Baseline Scenario

The grouped project activity baseline scenario is the usage of inefficient, conventional cooking devices by majority of the rural population of The Gambia. The existing traditional stoves used in the baseline are 3-stone stove or having stone with poor combustion air supply or flue gas ventilation system i.e. without a grate or a chimney. An assessment of baseline scenario is presented below:

1) Selection and Justification of the Baseline Scenario

Step 1: Alternative baseline scenarios:

As per latest Gambia Multiple Indicator Cluster Survey 2018 report⁶, prepared by the Govt of Gambia, The Gambia Bureau of Statistics and UNICEF, published in July 2019, more than 97% of the total households in Gambia rely on solid biomass as a cooking fuel. Among the rural households who are the primary beneficiaries of the project—over 99% depend on biomass. Specifically, 98.1% of rural households rely entirely on firewood and 1% on the charcoal as their baseline fuel, while less than 1% of the rural population uses clean fuel for cooking.

Percentage of household members in households using clean fuels and technology for cooking and percent distribution of household members using polluting fuels and technologies for cooking according to type of cooking fuel mainly used by the household, and percentage of household members living in households using polluting fuels and technologies for cooking. The Gambia MiCS, 2018																
Percentage of household members in households with primary reliance on:																Number of household members
	Solid fuels for cooking											No food cooked in the household	Total	Solid fuels and technology for cooking		
	Clean fuels and technologies ¹	Gasoline/ Diesel	Kerosene/ Paraffin	Coal/ Lignite	Charcoal	Wood	Crop residue / Grass/ Straw/ Shrubs	Animal dung/ waste	Processed biomass (pellets) or woodchips	Garbage/ Plastic	Sawdust				Other fuel for cooking	
Total	1.2	0.0	0.0	0.1	24.6	71.3	0.3	0.0	0.0	0.0	0.9	0.0	1.6	100.0	97.1	59,219
Area																
Urban	1.8	0.0	0.0	0.1	35.9	58.5	0.4	0.0	0.0	0.0	1.2	0.0	2.1	100.0	96.0	40,029
Rural	0.0	0.0	0.0	0.0	1.0	98.1	0.3	0.0	0.0	0.0	0.1	0.0	0.5	100.0	99.5	19,191
LGA																
Barjul	2.6	0.0	0.0	0.0	80.7	10.1	0.0	0.0	0.0	0.0	0.0	0.1	6.5	100.0	90.8	761
Kanifing	3.7	0.0	0.0	0.1	58.5	33.0	0.7	0.0	0.0	0.0	1.3	0.1	2.6	100.0	93.5	11,802
Brikama	0.9	0.0	0.0	0.1	25.1	70.6	0.3	0.0	0.0	0.0	1.2	0.0	1.7	100.0	97.2	23,452
Mansakonko	0.0	0.0	0.0	0.0	6.0	91.7	0.3	0.0	0.0	0.0	1.0	0.0	1.0	100.0	99.0	2,489
Kerewan	0.4	0.0	0.0	0.0	7.7	89.8	0.1	0.0	0.0	0.0	0.9	0.0	1.2	100.0	98.4	6,412
Kuntaur	0.0	0.0	0.0	0.0	1.4	97.6	0.3	0.0	0.0	0.0	0.0	0.0	0.7	100.0	99.3	2,704
Janjanbureh	0.0	0.0	0.0	0.1	3.4	95.7	0.1	0.0	0.0	0.0	0.0	0.1	0.7	100.0	99.1	4,125
Basse	0.1	0.0	0.0	0.0	4.7	94.5	0.2	0.0	0.0	0.0	0.0	0.0	0.5	100.0	99.4	7,473
Education of household head																
Pre-primary or none	0.3	0.0	0.0	0.1	17.7	79.4	0.4	0.0	0.0	0.0	1.0	0.0	1.1	100.0	98.5	36,896
Primary	1.1	0.0	0.0	0.0	27.3	66.8	0.0	0.0	0.0	0.0	1.9	0.1	2.8	100.0	96.0	4,953
Secondary+	3.3	0.0	0.0	0.1	38.3	55.4	0.3	0.0	0.0	0.0	0.4	0.1	2.2	100.0	94.4	17,170
DK/Missing	2.0	0.0	0.0	0.0	46.6	51.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	100.0	97.6	201
Ethnicity of household head																
Mandinka	0.7	0.0	0.0	0.0	21.4	74.7	0.5	0.0	0.0	0.0	1.4	0.1	1.1	100.0	98.1	18,363
Wolof	1.1	0.0	0.0	0.0	27.3	67.6	0.4	0.0	0.0	0.0	2.3	0.0	1.3	100.0	97.6	7,473
Fula	0.3	0.0	0.0	0.1	18.1	79.8	0.1	0.0	0.0	0.0	0.1	0.0	1.5	100.0	98.1	12,409

Table 4.2: Multiple Indicator Cluster Survey 2018

Also, as per the latest available Demographic and Health Survey (DHS)⁷ 2019-20, published in March 2021 by the Gambia Bureau of Statistics in collaboration with the Ministry of Health (MoH) and United Nations, 97.3% of the rural population relies on solid fuels for cooking, with

⁶

<https://www.unicef.org/gambia/media/776/file/The%20Gambia%20Multiple%20Indicator%20Cluster%20Survey%202018.pdf>

⁷ <https://dhsprogram.com/pubs/pdf/FR369/FR369.pdf>

93% of rural household's dependent on firewood and 4.3% using charcoal as their primary cooking fuel. The same report states that less than 1% of the rural population in Gambia use clean cooking fuels.

Table 2.4 Household characteristics						
Percent distribution of households and de jure population by housing characteristics, percentage using solid fuel for cooking, percentage using clean fuel for cooking, and percent distribution by frequency of smoking in the home, according to residence, The Gambia DHS 2019-20						
Housing characteristic	Households			Population		
	Urban	Rural	Total	Urban	Rural	Total
Electricity						
Yes	79.1	22.5	65.6	78.6	24.7	62.1
No	20.9	77.5	34.4	21.4	75.3	37.9
Total	100.0	100.0	100.0	100.0	100.0	100.0
Flooring material						
Earth, sand	1.5	21.6	6.2	1.6	20.3	7.4
Dung	0.0	1.0	0.2	0.0	1.0	0.3
Parquet or polished wood	0.3	0.0	0.2	0.3	0.0	0.2
Vinyl/lino/leum/plastic carpet	28.9	16.5	25.9	24.1	14.0	21.0
Ceramic tiles	43.8	7.1	35.1	47.0	6.5	34.5
Cement/concrete	22.3	53.7	29.8	24.6	58.0	34.9
Carpet	3.2	0.2	2.5	2.3	0.1	1.6
Other	0.1	0.0	0.1	0.0	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0
Rooms used for sleeping						
One	21.0	6.0	17.4	6.6	1.8	5.1
Two	25.7	13.8	22.9	16.2	6.8	13.3
Three or more	53.3	80.2	59.7	77.2	91.4	81.6
Total	100.0	100.0	100.0	100.0	100.0	100.0
Place for cooking						
In the house	8.1	1.5	6.5	4.3	0.8	3.2
In a separate building	50.7	83.3	58.4	68.5	89.0	74.8
Outdoors	30.2	13.0	26.1	24.9	9.8	20.3
No food cooked in household	10.9	2.2	8.8	2.3	0.3	1.7
Other	0.1	0.0	0.1	0.0	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0
Cooking fuel						
Electricity	0.3	0.0	0.2	0.3	0.0	0.2
LPG/biogas	7.7	0.4	5.9	3.2	0.1	2.2
Kerosene	0.4	0.0	0.3	0.2	0.0	0.2
Charcoal	47.1	4.3	36.9	43.2	2.8	30.8
Wood	33.3	93.0	47.5	50.1	96.7	64.5
Straw/shrubs/grass	0.0	0.0	0.0	0.1	0.0	0.0
Sawdust	0.3	0.1	0.3	0.4	0.1	0.3
Other fuel	0.0	0.0	0.0	0.0	0.0	0.0
No food cooked in household	10.9	2.2	8.8	2.3	0.3	1.7
Total	100.0	100.0	100.0	100.0	100.0	100.0
Percentage using solid fuel for cooking¹	80.7	97.3	84.7	93.9	99.5	95.6
Percentage using clean fuel for cooking²	7.9	0.4	6.1	3.5	0.1	2.5
Frequency of smoking in the home						
Daily	16.4	17.8	16.7	19.2	19.2	19.2
Weekly	4.0	4.5	4.1	4.2	4.1	4.1
Monthly	1.3	0.9	1.2	1.6	0.8	1.3
Less than once a month	2.3	1.5	2.1	2.2	1.3	1.9
Never	76.1	75.3	75.9	72.8	74.7	73.4
Total	100.0	100.0	100.0	100.0	100.0	100.0
Number of households/ population	4,989	1,560	6,549	36,581	16,236	52,817
LPG = Liquefied petroleum gas						
¹ Includes charcoal, wood, straw/shrubs/grass, and sawdust						
² Includes electricity and LPG/biogas						

Table 2.4: Demographic and Health Survey 2019-2020

Additionally, based on the beneficiary selection criteria set by the Project Proponent (PP), households using fuels other than biomass or those already equipped with improved cookstoves featuring chimneys, fuel gas ventilation systems, or grates are not eligible for the project activity. As part of the improved cookstove (ICS) distribution process, the PP verifies with beneficiaries that they are using traditional wood-fuel cookstoves before project ICS distribution. Only after this confirmation end users receive the ICS. The baseline stove can also be validated through the user agreement/ sales ledger/poster. This is acknowledged by

the end-user in the form of a signed ICS usage practices poster where the information is written down. This information can be checked through the sample posters.

Thus, based on the above data, use of solid biomass for cooking emerges as the primary baseline scenario for the grouped project. Since the Project Proponent (PP) provides improved cookstoves (ICS) exclusively to households that were previously using wood-based traditional inefficient stoves, all project beneficiaries meet the baseline requirement of relying on non-renewable wood fuel in traditional inefficient cookstoves.

The project intervention directly replaces traditional wood-based cooking practices with improved cookstoves. The only alternative scenario is the project activity without being registered under a GHG program.

A baseline survey was undertaken during the project registration to assess the baseline technology. It was confirmed that three stone was the baseline practice along with a conventional device with no improved combustion air supply or flue gas ventilation, that was without a grate or a chimney. Thus, the baseline scenario established in the registered PD-MR aligns with the latest official / national reports (aforesaid mentioned) published as at date.

The only alternative scenario is the project activity without being registered under a GHG program⁸.

Step 2: Existing and forthcoming government policies and legal requirements

Since it has been confirmed that solid biomass is the primary baseline scenario and the only alternative scenario is the project activity without being registered under a GHG program, the requirement to eliminate baseline alternatives that are inconsistent with existing or forthcoming mandatory legal or regulatory requirements is not applicable.

There are no government-imposed restrictions or binding regulations as per the policies reviewed that prohibit the continued use of traditional biomass cookstoves in the project region. Additionally, there are no mandatory efficiency standards or air quality regulations that would systematically enforce a transition away from traditional biomass-based cooking. Therefore, the consideration of alternative baseline scenarios remains unchanged, and no further eliminations are required under this criterion.

Step 3: Financial, institutional, and information barriers

As explained above, the only alternative scenario is the project activity without being registered under a GHG program. However, this scenario is not viable due to significant financial barriers.

⁸ As per applied methodology page 12: The project activity without being registered as a project activity under a GHG program must be included as an alternative.

Since the Project Proponent (PP) distributes improved cookstoves (ICS) free of cost to end users, the project relies solely on revenue from the sale of Verified Carbon Units (VCUs) to sustain its operations. Without registration under a GHG program, the project would lack a financial mechanism to cover the costs of cookstove production, distribution, and monitoring.

As a result, the alternative scenario of implementing the project without GHG registration is not financially feasible and cannot be considered a realistic baseline alternative. Therefore, no alternate baseline scenarios exist.

Thus, the remaining baseline scenario is the target population's continued use of inefficient cookstoves fired with non-renewable firewood to meet similar thermal energy outputs for cooking as the project devices. Therefore, the project activity remains consistent with the defined baseline scenario, ensuring compliance with the methodology.

2) Baseline KPTs

A comprehensive baseline KPT assessment was conducted by PP in November 2022, during the project registration, covering 142 Gambian households. The same has been validated by independent VVB and approved by VCS (refer Registered JPD MR, p. 55). According to *VM0050 : Correction and Clarifications; page 7; Correction #1* the follow-up baseline assessments are only required every five years. Therefore, no new baseline KPTs are deemed necessary, until Nov 2027. Thus, no new baseline fuel consumption measurements were conducted for requantification purposes.

The results of the baseline KPTs conducted at project registration (refer registered joint PD-MR, section 3.4, page 46-48) are summarized below:

“Sample Size Calculation and Selection Criteria:

Sample size was determined using CDM Guideline: Sampling and Survey for CDM PA and PoA version 4.0.

The Gambia is divided into 5 Regions. With each Region comprising of multiple Districts. To demonstrate generalisation of results each Region was selected, with a District randomly chosen from each Region. This resulted in the following 6 Districts being selected:

- 1. Foni Jarrol (Western Region),*
- 2. Kiang Central (Lower River Region),*
- 3. Upper Baddibu (North Bank Region),*
- 4. Niamina East (Central River Region);*
- 5. Sami (Central River Region);*
- 6. Fulladu East (Upper River Region).*

(Central River Region was sub-divided into Northern and Southern districts based on contextualized insight from local experts within The Gambia, resulting in 2 districts being chosen from this Region).

The sample size was calculated as per CDM Guideline on 95/10 precision confidence. This resulted in a required minimum sample size of 43 for the parameter Bold. PP then oversampled to account for potential non-responses, data quality concerns, and hardware errors. This process resulted in a total target sample size of 150 i.e. 25 samples per district. Out of the 150 target samples, baseline KPTs were successfully conducted on a total of 142 households in line with CCA KPT protocol.

Procedures followed for Conducting KPT:

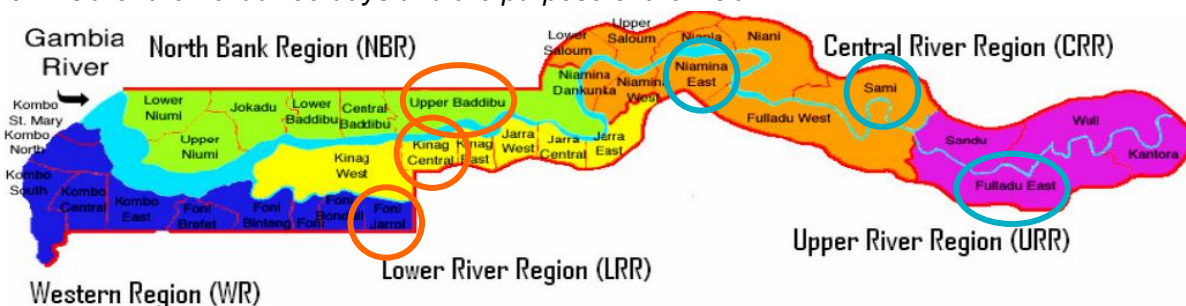
The KPT surveys were conducted by a competent team trained for the KPT surveys for performing KPTs, based on the KPT protocol. Once the districts were selected by the operational team, enumerators were issued with protocols for the selection of the individual households. These protocols outlined that the selected households should, but are not limited to, the following criteria in accordance with the KPT protocol:

- Have the person who is primarily responsible for cooking available for visits once a day for the next 4 days;*
- Not have any events scheduled that would disrupt normal cooking practices during this time (e.g Weddings, community events);*
- Primarily cook on wood*

Additionally, the enumerators were instructed to follow, but are not limited to, the following criteria in accordance with the KPT protocol:

- Please avoid a measurement campaign during special occasions, holidays, or any day when cooking is not normal and be aware of local events like market days that may involve above-average fuel consumption. Be aware that 3 days of testing involves 4 days in contact with the family—the first day is spent briefing families, as explained in the next step.*
- To explain the purpose of the test to the family members and arrange to measure their fuel consumption.*
- Stress to household members that their cooking practices should remain as close to normal as possible for the duration of the test.*
- Explain to family members that the surveyor will visit the respondent daily (for the next ~3 days) to collect the information.*
- Ask the family to define an inventory area to store the fuel during the test. Record the weight and moisture content of the initial stock of fuels and if the family is going to collect or purchase fuel during the days of the test, ask them to keep newly collected or purchased fuel separate from fuel that has already been tested for moisture and weighed.*
- Visit each household at roughly the same time each day, without being intrusive.*
- Record fuel consumption by weighing the remaining fuel. Record the weight and moisture content of newly collected fuel before it is added to the family's stock.*
- Moisture should be read the day before from the stock of fuel that is going to be used during the next 24-hour period. For each day, randomly draw 3 pieces of the fuel and measure its moisture in three positions.*

The baseline KPTs were conducted using a specially designed questionnaire as per KPT protocol approved by Clean Cooking Alliance⁹. The questionnaire has the provision of accounting seasonal variation as per the KPT protocol. The quantitative measurement of fuel wood which is the primary fuel, was done with a weighing scale and moisture meter and its consumption was measured for 3 consecutive days in the sampled households, visiting those households on 4 consecutive days. The first day was spent briefing families about their visit for the next three days and the purpose of the visit.



KPT Results:

A digitized data collection approach was taken by the team, where the survey responses and measurement records were recorded in the electronic survey forms through smartphones. The survey responses for each household were recorded in the centralized database, where all the survey results were combined, and the final KPT survey Excel sheet was exported.

The average annual woody biomass used for kitchen activities on pre-project devices came out to be 0.839 tonnes per person. The result was scaled up to household level by multiplying with average household size of the Gambia, which is 8.28 as per Global Data Hub for year 2022¹⁰. With this average household size, the average biomass woody biomass used in kitchen activities in baseline scenario comes out to be 6.947 tonnes a year.

The parameter was within the 95/10 confidence/precision which can be checked in the table below:

Mean Consumption	0.839 (tonnes/person/Year)
Precision (95/10)	7.37%

3.5 Additionality

The additionality of the project is demonstrated as per the requirements outlined in Section 7 of the applied methodology:

3.5.1 Regulatory Surplus

Is the project located in an UNFCCC Annex 1 or Non-Annex 1 country?

☐ Annex 1 country

☒ Non-Annex 1 country

¹⁰ <https://globaldatalab.org/areadata/table/hhsize/GMB/?levels=1+4>

Are the project activities mandated by any law, statute, or other regulatory framework?

☐ Yes

☒ No

If the project is located inside a Non-Annex 1 country and the project activities are mandated by a law, statute, or other regulatory framework, are such laws, statutes, or regulatory frameworks systematically enforced?

☐ Yes

☐ No

3.5.2 Additionality Methods

The applied methodology provides the two options to choose from, i.e., activity method and Project method, to demonstrate additionality. PP choose to demonstrate the additionality by activity method and is elaborated below.

Activity Method

- **Step 1: Regulatory Surplus**

There is no mandated government programme or policy in host country of this project ensuring the distribution of domestic fuel-efficient cookstoves. The project is not mandated by any law, statute or other regulatory framework, or for UNFCCC non-Annex I countries, any systematically enforced law, statute or other regulatory framework.

Households may only participate voluntarily in this project. It is hereby confirmed that the proposed project is a voluntary coordinated action by DelAgua.

- **Step 2: Positive List**

Requirement:

The project activity must meet both of the following conditions to qualify for the positive list:

- 1) The project activity introduces:
 - a) Efficient biomass-fired cookstoves that replace inefficient biomass-fired cookstoves;
 - b) Efficient, solely renewable biomass-fired cookstoves that replace fossil fuel-fired cookstoves; or
 - c) Electric cookstoves that replace inefficient biomass-fired or fossil fuel-fired cookstoves.
- 2) The project activity installs or distributes improved cookstoves at zero cost to the end user and has no revenue source other than from the sale of verified carbon units (VCUs).

Justification:

The project meets the Positive List criteria as defined in the methodology, demonstrating automatic additionality:

- 1) It introduces efficient biomass-fired cookstoves that replace inefficient biomass-fired cookstoves, fulfilling Condition 1(a) of Section 7 of the methodology.
- 2) It distributes improved cookstoves at free of cost to end users, with no revenue source other than the sale of Verified Carbon Units (VCUs), satisfying Condition 2 of Section 7 of the methodology.

Based on the above substantiation, the grouped project complies with the requirement of positive list and no further demonstration required for additionality. Therefore, the GP is considered an additional activity.

3.6 Methodology Deviations

Not applicable.

4 QUANTIFICATION OF ESTIMATED GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

As per the section 8.1 of applied methodology, Baseline emissions are calculated as follows:

$$BE_y = \sum EC_{i,y} \times N_{j,k,y} \times n_{j,k,y} \times (EF_{b,i,CO_2} \times f_{NRB,y} + EF_{b,i,nonCO_2}) \quad (1)$$

Where:

BE_y	Baseline emissions during year y (t CO ₂ e)
$EC_{i,y}$	Average energy consumption of baseline device type i in year y (TJ)
$N_{j,k,y}$	Number of commissioned project devices of type j from batch k in year y
$n_{j,k,y}$	Proportion of commissioned project devices of type j from batch k that remain operating in year y (fraction)
EF_{b,i,CO_2}	CO ₂ emission factor for fuel used by baseline device type i in the baseline scenario (t CO ₂ /TJ)
$f_{NRB,y}$	Fraction of woody biomass that is established to be non-renewable used by baseline device in year y (fraction)
$EF_{b,i,nonCO_2}$	Non-CO ₂ emission factor for fuel used by baseline device type i in the baseline scenario (t CO ₂ e/TJ)
i	Baseline device type and its respective fuel type
j	Project device type and its respective fuel type

The average energy consumption of baseline device type i is calculated as follows:

$$EC_{i,y} = BC_{b,i,y} \times NCV_{b,i} \quad (2)$$

Where:

$BC_{b,i,y}$	Fuel used per baseline device type i during year y (tonnes) ¹¹
$NCV_{b,i}$	Net calorific value of baseline fuel for baseline device type i (TJ/tonne)

Cross-check of $EC_{i,y}$ to address stove stacking

Compare the quantity of baseline energy consumption ($EC_{i,y}$) to energy used in the project scenario ($EC_{p,y}$) using back-calculation:

$$EC_{est,y} = EC_{p,y} \times \eta_{new,avg,y} / \eta_{old,avg} \quad (3)$$

Where:

$EC_{est,y}$	Back-calculated energy consumption of the potential mix of devices and fuels in the baseline in year y (TJ)
$EC_{p,y}$	Energy used in project scenario by project devices during year y (TJ)
$\eta_{new,avg,y}$	Weighted average efficiency of project devices in year y (fraction)
$\eta_{old,avg}$	Weighted average efficiency of baseline devices that are replaced by project devices (fraction)

If baseline consumption ($EC_{i,y}$) exceeds back-calculated project consumption ($EC_{est,y}$), $EC_{est,y}$ will be used as a conservative cap in Equation (1) as follows:

$$BE_y = \sum \min \{EC_{i,y}, EC_{est,y}\} \times N_{j,k,y} \times n_{j,k,y} \times (EF_{b,i,CO2} \times f_{NRB,y} + EF_{b,i,nonCO2}) \quad (1a)$$

$$EC_{p,y} = \sum_{j,k} BC_{p,j,k,y} \times NCV_{p,j} \quad (4)$$

Where:

$BC_{p,j,k,y}$	Average quantity of fuel used by project device type j from batch k during year y (tonnes or m ³)
$NCV_{p,j}$	Net calorific value of project fuel used in project device type j (TJ/tonne or TJ/m ³)

Section 8.1.1.1 (Equation 5) of the methodology is not applicable since the project does not involve electric cookstoves and focuses on the distribution of improved biomass cookstoves.

Sample Calculations of Estimated Baseline Emissions for year 2024:

Parameter	Applied value/Approach
-----------	------------------------

¹¹ This parameter corresponds to $BC_{ex-ante,b,i}$ for the first two years and where the follow-up baseline survey campaign shows that there are no significant changes in baseline fuel consumption. Otherwise, it corresponds to $BC_{b,i,y}$. However, In accordance with 'Correction and Clarifications to VM0050' dated 03 Feb 2025, it is entirely at the discretion of the project participant (PP) to determine whether to conduct any additional follow-up baseline surveys within the five years from the date of the last survey.

$$\begin{aligned}
 BC_{b,i,y} &= BC_{b,i,y} \text{ (tons/person/year)} * H_{hi} \text{ (average HH size)} = 0.839 * 8.28 = 6.947 \text{ tons/year} \\
 &\text{The values of } BC_{b,i,y} \text{ and } H_{hi} \text{ should be derived from the Baseline survey/KPT.} \\
 NCV_{b,i} &= 0.0156 \text{ TJ/tonne (Meth Default Value)} = NCV_{p,j} \\
 EC_{i,y} &= BC_{b,i,y} * NCV_{b,i} = 6.947 * 0.0156 = 0.1084 \text{ TJ} \\
 EC_{est,y} &= EC_{p,y} * \eta_{new,avg,y} / \eta_{old,avg} = 0.0319 * 0.5091 / 0.15 = 0.1084 \text{ TJ} \\
 &\eta_{new,avg,y} = 0.5091 \text{ (assumed for ex-ante estimation only)} \\
 &\eta_{old,avg} = 0.15 \text{ (Meth Default Value)} \\
 &\text{Where } EC_{p,y} \text{ is calculated as follows:} \\
 EC_{p,y} \text{ (tons/year)} &= BC_{p,j,k,y} \text{ (tons/person/year)} * H_{h_{j,k}} * NCV_{p,j} \\
 &= 2.047 * 0.0156 = 0.0319 \text{ TJ} \\
 &\text{The value of } BC_{p,j,k,y} \text{ should be derived from the project KPT/survey and } H_{h_{j,k}} \\
 &\text{(same as } H_{hi}) \text{ from the Baseline KPT/survey in line with the applied methodology.} \\
 BE_y &= \text{Min} (EC_{i,y}, EC_{est,y}) * N_{j,k,y} * n_{j,k,y} * (EF_{b,i,CO2} * f_{NRB,y} + EF_{b,i,nonCO2}) \\
 &= 0.1084 * 150,000 * 0.9 * (112 * 0.666 + 9.46) \\
 &= 1,228,500 \text{ tCO}_2\text{e (Estimated Baseline Emissions for a year)} \\
 &\text{Where, } N_{j,k,y} = 150,000 \text{ (Assumed, for calculation purpose only and full year operational)} \\
 &n_{j,k,y} = 0.9 \text{ (assumed for ex-ante estimation only)} \\
 EF_{CO2} &= 112 \text{ tCO}_2\text{e/TJ (Meth Default Value)} \\
 EF_{non-CO2} &= 9.46 \text{ tCO}_2\text{e/TJ (Meth Default Value)} \\
 f_{NRB} &= f_{NRB} \text{ (as per registered PD)}
 \end{aligned}$$

4.2 Project Emissions

As per the section 8.2 of applied methodology, Baseline emissions are calculated as follows:

$$PE_y = PE_{energy,y} + PE_{others,y} \quad (6)$$

Where:

PE_y	Project emissions during year y (t CO ₂ e)
$PE_{energy,y}$	Project emissions from energy consumption of project devices in year y (t CO ₂ e)
$PE_{others,y}$	Project emissions from other sources in year y (t CO ₂ e)

Project emissions from energy consumption of project devices using biomass in year y are calculated as follows:

$$\begin{aligned}
 PE_{energy,y} &= \sum_j \sum_k BC_{p,j,k,y} * N_{j,k,y} * NCV_{p,j} * n_{j,k,y} * \\
 &\quad (EF_{p,j,CO2} * f_{NRB,y} + EF_{p,j,nonCO2})
 \end{aligned} \quad (7)$$

Where:

$EF_{p,j,CO2}$	CO ₂ emission factor for fuel used by project device type j in the project scenario (t CO ₂ /TJ)
----------------	--

$EF_{p,j,nonCO2}$
Non-CO2 emission factor for fuel used by project device type
 j (t CO₂e/TJ)

Section 8.2.2 (Equation 8) of the methodology is not applicable since the project does not involve electric cookstoves and focuses on the distribution of improved biomass cookstoves.

Section 8.2.3 (Equations 9 and 10) of the methodology does not apply as the project exclusively focuses on the distribution of improved biomass cookstoves and does not involve electric cookstoves, renewable biomass, biomass-derived fuels, or renewable charcoal.

Furthermore, woody biomass remains the primary fuel in both the baseline and project scenarios, sourced from local markets or nearby forest areas. As the fuel transportation distance (including both long-distance supply and home delivery) is expected to be less than 200 km, project emissions from fuel transportation can be ignored.

Thus $PE_{others,y}$ (Equation 9) will be considered zero in the calculation of project emissions.

Sample Calculations of Estimated Project Emissions for a year:

Parameter	Applied value ¹² /Approach
$PE_{energy,y}$	$= BC_{p,j,k,y} (\text{tons/person/year}) \times Hh_{j,k} \times N_{j,k,y} \times NCV_{p,j} \times n_{j,k,y} \times (EF_{p,j,CO2} \times f_{NRB,y} + EF_{p,j,nonCO2})$ $= 2.047 \times 1,50,000 \times 0.0156 \times 0.9 \times (112 \times 0.666 + 9.46)$ $= 361,500 \text{ tCO}_2\text{e}$ The value of $BC_{p,j,k,y}$ is derived from the project KPT and $Hh_{j,k}$ (same as Hh_i) is derived from the Baseline KPT in line with the applied methodology.
$PE_{others,y}$	= 0
PE_y	$= PE_{energy,y} + PE_{others,y}$ $= 361,500 \text{ tCO}_2\text{e}$ (Estimated Project Emissions for a year)

4.3 Leakage Emissions

As per Section 8.3 of the methodology, an adjustment factor of 0.95 will be applied in Equation 11 to account for leakage emissions associated with the reduced or avoided use of non-renewable biomass.

The grouped project does not involve fuel switch and charcoal usage.

4.4 Estimated GHG Emission Reductions and Carbon Dioxide Removals

As per section 8.4 of the methodology Net GHG emission reductions are calculated as follows:

¹² The values provided are for representation purposes only and used for sample calculations. The actual parameter values can be found in the relevant section.

$$ER_y = (BE_y - PE_y) \times 0.95 - LE_{RB,y} \quad (11)$$

Where:

ER_y Emission reductions during year y (t CO₂e)
 $LE_{RB,y}$ Leakage emissions associated with use of renewable biomass during year y (t CO₂e)

Sample Calculations of Estimated Net GHG Emission Reductions for a Year:

$$\begin{aligned} ER_y &= (BE_y - PE_y) \times 0.95 - LE_{RB,y} \\ &= (1,228,500 - 361,500) \times 0.95 - 0 \\ &= 823,650 \text{ tCO}_2\text{e (Estimated Net GHG Emission Reductions for a year)} \end{aligned}$$

Vintage period	Estimated baseline emissions (tCO ₂ e)	Estimated project emissions (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated reduction VCU (tCO ₂ e)	Estimated removal VCU (tCO ₂ e)	Estimated total VCUs (tCO ₂ e)
23-Feb-2023 to 31-Dec-2023	532,980	156,848	18,807	357,325	-	357,325
01-Jan-2024 to 31-Dec-2024	1,228,500	361,500	43,350	823,650	-	823,650
01-Jan-2025 to 31-Dec-2025	1,638,000	482,000	57,800	1,098,200	-	1,098,200
01-Jan-2026 to 31-Dec-2026	1,638,000	482,000	57,800	1,098,200	-	1,098,200
01-Jan-2027 to 31-Dec-2027	1,602,000	472,000	56,500	1,073,500	-	1,073,500
01-Jan-2028 to 31-Dec-2028	1,566,000	462,000	55,200	1,048,800	-	1,048,800
01-Jan-2029 to 31-Dec-2029	1,530,000	452,000	53,900	1,024,100	-	1,024,100
01-Jan-2030 to 22-Feb-2030	216,000	64,000	7,600	144,400	-	144,400
Total	-	-	-	6,668,175		6,668,175

For detailed calculation, please refer to the ex-ante ER calculator.

5 MONITORING

5.1 Data and Parameters Available at Validation

The following parameters are fixed for the entire crediting period using default values as per the methodology:

Data / Parameter	$\eta_{old,avg}$
Data unit	Fraction
Description	Weighted average efficiency of baseline devices that are replaced by project devices
Equations	(3)
Source of data	VM0050 methodology default (Page 30)
Value applied	15% (0.15)
Justification of choice of data or description of measurement methods and procedures applied	For a three-stone fire using firewood or a cookstove without an improved combustion air supply or flue gas ventilation, a default value of 15% is applied. The project distributes non-renewable wood-based improved cookstoves (ICS), replacing only baseline devices that meet these criteria.
Purpose of data	Calculation of baseline emissions
Comments	--

Data / Parameter	EF_{b,i,CO_2} EF_{p,j,CO_2}
Data unit	t CO ₂ /TJ
Description	CO ₂ emission factor for fuel used by baseline device type i in the baseline scenario CO ₂ emission factor for fuel used by project device type j in the project scenario
Equations	(1), (7), (10)
Source of data	Option 3: Default value from the most recent version of the IPCC Guidelines for National Greenhouse Gas Inventories
Value applied	Wood: 112 t CO ₂ /TJ

Justification of choice of data or description of measurement methods and procedures applied	IPCC default value for wood as per the applied methodology
Purpose of data	Calculation of baseline emissions and project emissions
Comments	--

Data / Parameter	$EF_{b,i,non-CO2}$ $EF_{p,j,non-CO2}$
Data unit	t CO ₂ e/TJ
Description	Non-CO ₂ emission factor for fuel used by baseline device type i in the baseline scenario Non-CO ₂ emission factor for fuel used by project device type j in the project scenario
Equations	(1), (7)
Source of data	Option 3: Default value from the most recent version of the IPCC Guidelines for National Greenhouse Gas Inventories
Value applied	Wood: 9.46 t CO ₂ e/TJ (AR5 GWP)
Justification of choice of data or description of measurement methods and procedures applied	IPCC default value for wood as per the applied methodology
Purpose of data	Calculation of baseline emissions and project emissions
Comments	--

Data / Parameter	$NCV_{b,i}$ $NCV_{p,j}$
Data unit	TJ/tonne
Description	Net calorific value of baseline fuel used by baseline device type i Net calorific value of project fuel used by project device type j

Equations	(2), (4), (7), (10)
Source of data	Option 3: Default value from the most recent version of the IPCC Guidelines for National Greenhouse Gas Inventories
Value applied	Wood: 0.0156 TJ/tonne
Justification of choice of data or description of measurement methods and procedures applied	2006 IPCC Guidelines for National Greenhouse Gas Inventories as per the applied methodology
Purpose of data	Calculation of baseline emissions and project emissions
Comments	--

Data / Parameter	$BC_{ex-ante,b,i}$
Data unit	Tonnes/HH/Year
Description	Ex-ante annual average quantity of fuel used per baseline device type i
Equations	(2)
Source of data	Registered JPDMR Page 56 (link)
Value applied	6.947
Justification of choice of data or description of measurement methods and procedures applied	Measurement campaign following the Kitchen Performance Test
Purpose of data	Calculation of baseline emissions
Comments	Energy consumption has been determined prior to validation.

Data / Parameter	Hh_i $Hh_{j,k}$
Data unit	Equivalent standard male adults
Description	Average household size of the target population using device type i Average household size of the target population using device type j from batch k
Equations	Input to $EC_{i,y}$, $BC_{b,i,y}$, and $BC_{p,j,k,y}$

Source of data	Registered JPDMR Page 55 (link)
Value applied	8.28
Justification of choice of data or description of measurement methods and procedures applied	The value is sourced from published report available in public domain for The Gambia.
Purpose of data	Estimation of average energy consumption when applying Option 1: Measurement campaign (Section 8.1.1) of the applied methodology Cross-checking energy and fuel consumption values
Comments	

5.2 Data and Parameters Monitored

Data / Parameter	$N_{j,k,y}$														
Data unit	Number														
Description	Number of commissioned project devices of type j from batch k in year y														
Equations	(1), (7), (8)														
Source of data	Monitoring (ICS distribution database)														
Description of measurement methods and procedures applied	The following data will be recorded during project activity implementation: 1. Number of new devices distributed under the project activity, identified by the type of device and date of commissioning; and 2. Identification information of the recipient of the device distributed under the project activity (e.g., name, address, phone number). Data management and reporting of this information shall adhere to both data privacy requirements and good practice														
Frequency of monitoring/recording	Every time that new project devices are distributed														
Value applied:	<table> <tr> <th>Year</th><th>$N_{j,k,y}$</th></tr> <tr> <td>2023</td><td>76,140</td></tr> <tr> <td>2024</td><td>150,000</td></tr> <tr> <td>2025</td><td>200,000</td></tr> <tr> <td>2026</td><td>200,000</td></tr> <tr> <td>2027</td><td>200,000</td></tr> <tr> <td>2028</td><td>200,000</td></tr> </table>	Year	$N_{j,k,y}$	2023	76,140	2024	150,000	2025	200,000	2026	200,000	2027	200,000	2028	200,000
Year	$N_{j,k,y}$														
2023	76,140														
2024	150,000														
2025	200,000														
2026	200,000														
2027	200,000														
2028	200,000														

	2029	200,000	
	2030	200,000	
Monitoring equipment	N/A		
QA/QC procedures applied	N/A		
Purpose of data	Calculation of baseline and project emission		
Calculation method	N/A		
Comments	The number of project devices will be recorded in a sales database to ensure transparency.		

Data / Parameter	$n_{j,k,y}$
Data unit	Fraction
Description	Proportion of commissioned project devices of type j from batch k that are still being used regularly in year y
Equations	(1), (7), (8)
Source of data	Monitoring (Project Usage Surveys)
Description of measurement methods and procedures applied	Option 1 (SUMs): Measured directly using stove use monitors (SUMs) in a sample of users according to the most recent version of the CDM Standard for Sampling and Surveys for Project Activities and Programmes of Activities and achieving 90/10 confidence precision for the proportion of devices in operation. The SUMs must confirm that the stove is frequently used and functional. Option 2 (surveys): Based on an adoption rate determined by a survey according to the most recent version of the CDM Standard for Sampling and Surveys for Project Activities and Programmes of Activities and achieving 90/10 confidence precision for the proportion of devices in operation. The lower end of the 90% confidence interval will be used to ensure conservativeness. The adoption survey will include: - Kitchen observation (which includes visual and physical checks of the stove and its components), including photographic evidence; and - Interview with the primary cook. The project proponent will provide proof of training and supervision to ensure field teams have the capacity required to complete adoption surveys successfully. The average of the sum of "yes" (1) responses to the adoption survey question "If yes, have you used the stove regularly since you installed it?" (where this response is cross-checked and confirmed with the physical check of the stove and the coherency with the responses to the following questions of the survey), and "no" (0) responses to the questions "do you use

	the project cookstove?" and "If yes, have you used the stove regularly since you installed it?". where the project does not achieve the target precision in a monitoring period, the project proponent will apply an appropriate conservativeness deduction as per Section 4 of the most recent version of the CDM Standard for Sampling and Surveys for CDM Project Activities and Programmes of Activities.
Frequency of monitoring/recording	Option 1: (SUMs): continuous Option 2 (surveys): annually
Value applied:	0.90
Monitoring equipment	Not Applicable.
QA/QC procedures applied	The date on which a sample project device stopped being used should be taken as follows: Option 2 (surveys): Where the project device is not working or not being used at the time of conducting the survey, it should be conservatively assumed that the project device has not been active since the date on which the last adoption survey was conducted.
Purpose of data	Calculation of baseline and project emissions
Calculation method	N/A.
Comments	-

Data / Parameter	$f_{NRB,y}$
Data unit	Fraction or %
Description	Fraction of woody biomass that is established to be non-renewable used by device in year y
Equations	(1), (7)
Source of data	Option 2: Calculated based on CDM TOOL30 and applying an uncertainty discount of 26%.
Description of measurement methods and procedures to be applied	Calculated as per the "TOOL30: Calculation of the fraction of non-renewable biomass" and applying an uncertainty discount of 26% in accordance with applied methodology
Frequency of monitoring/recording	Ex-ante for each crediting period
Value applied	0.90 0.666 (After accounting for 26% Uncertainty factor)
Monitoring equipment	N/A
QA/QC procedures to be applied	N/A
Purpose of data	Calculation of baseline and project emissions
Calculation method	The value of 0.90, registered in the Project Design Document (PD) under TOOL30 Version 4 for Gambia, is adjusted to account

	for uncertainty in accordance with VM0050. A 26% uncertainty discount is applied, resulting in the following adjusted value: $0.90 \times (1-0.26) = 0.666$
Comments	--

Data / Parameter	$BC_{b,i,y}$
Data unit	Tonnes/HH/Year
Description	Fuel used per baseline device type i during year y
Equations	(2)
Source of data	Option 1: A measurement campaign following the Kitchen Performance Test Protocol in control households that do not participate in the project, established prior to validation as statistically equivalent to the pre-project conditions of project households regarding baseline fuel consumption Please refer Registered JPDMR Page 56 (link)
Description of measurement methods and procedures to be applied	-
Frequency of monitoring/recording	Every five years
Value applied	6.947
Monitoring equipment	
QA/QC procedures to be applied	-
Purpose of data	Calculation of baseline emissions
Calculation method	N/A
Comments	The project has identified 142 households (not participating in the project) as the control group and conducted baseline surveys on them. After five years (or earlier), at the time of re-assessment of baseline, with the subjects of controlled group, if any of the 142 households are not traceable (or have relocated), new control subjects (households) may be added to the control group.

Data / Parameter	$\eta_{new,avg,y}$
Data unit	Fraction
Description	Weighted average efficiency of project devices in year y
Equations	(3)
Source of data	Monitoring (Manufacturer certified / Standard WBT campaigns)

Description of measurement methods and procedures applied	The efficiency shall established using one of the following methods, and the corresponding documentation shall be presented: 1) Water Boiling Test campaigns achieving 90/10 confidence and precision levels as per the most recent version of the CDM Standard for Sampling and Surveys for CDM Project Activities and Programmes of Activities 2) Manufacturer-certified value that is determined via Water Boiling Test; or 3) Certification from the host country's national standards body or certifying agency. The Standard Water Boiling Test campaigns (option a) will be used to account the decrease in thermal efficiency of the project device j from batch k due to aging during a given monitoring period.
Frequency of monitoring/recording	Annually
Value applied:	Kuniokoa¹³ Generation 2: • 0.4340 for project stove without skirting • 0.5130 for project stove with pot skirting
Monitoring equipment	-
QA/QC procedures applied	N/A
Purpose of data	Calculation of baseline and project emissions
Calculation method	N/A
Comments	The parameter will be calculated as a weighted average of the efficiency of a skirted stove and a non-skirted stove, taking into consideration the usage of pot skirt. Surveys shall be conducted to determine the number of kitchen activities that occur with and without a pot skirt. PP has used the test reports from the certification or national lab i.e. Centre for Research in Energy and Energy Conservation (CREEC) Laboratory. The Centre for Research in Energy and Energy Conservation (CREEC) is recognized under the Uganda National Bureau of Standards (UNBS) Laboratory Recognition Scheme in accordance with the international standard ISO IEC 17025: 2005 Different models of ICS may be used at the time of distribution (hence monitoring), as indicated in Section 1.12 of PD

¹³ CREEC lab Certification reports provided to the VVB.

Data / Parameter	$BC_{p,j,k,y}$
Data unit	Tonnes/HH/Year
Description	Average quantity of fuel used by project device type j from batch k during year y
Equations	(4), (7)
Source of data	Monitoring (Project KPT campaign)
Description of measurement methods and procedures to be applied	Option 1: Kitchen Performance Test (KPT) A measurement campaign following the Kitchen Performance Test Protocol protocol must be designed, carried out, and analyzed in compliance with the most recent version of the CDM Standard for Sampling and Surveys for CDM Project Activities and Programmes of Activities. The campaign must achieve confidence and precision of at least 90/10 for the target parameter of average daily fuel consumption per adult equivalent. The result must be scaled appropriately using the average household size to obtain the value of $BC_{p,j,k,y}$. Project activities applying KPTs must also measure the quantity of fuel used by pre-project devices that are still operational and provide it in the calculation sheet and monitoring reports (this is a reporting-only requirement). Option 2: Direct measurement Apply continuous direct measurement using equipment calibrated in accordance with national/international requirements. A sample of project devices may be measured in such a way that confidence and precision of 90/10 is achieved for the target parameter of total annual fuel use. The sampling must comply with the most recent version of the CDM Standard for Sampling and Surveys for CDM Project Activities and Programmes of Activities.
Frequency of monitoring/recording	Biennial or annual for Option 1 Continuous and aggregated annually for Options 2 and 3
Value applied	2.03
Monitoring equipment	N/A
QA/QC procedures to be applied	Where SUMs are used to measure project stove adoption, the stove usage indicated by the measurements for this parameter must be consistent with the frequency of use indicated by SUM measurements.
Purpose of data	Calculation of baseline and project emissions
Calculation method	N/A
Comments	N/A

5.3 Monitoring Plan

The Grouped Project in The Gambia is following VCS standard requirements applicable, along with the methodological requirements on monitoring a grouped non-AFOLU large project activity. The Monitoring Plan is elaborated in multiple sub-sections for the sake of clarity.

PP shall maintain detailed records of the commissioning dates for all project devices, categorized by type (j) and batch (k), in accordance with the applied methodology. Throughout the crediting period, PP systematically monitors and records all relevant parameters as outlined in Section 9.2 of the methodology.

The following monitoring plan is designed in accordance with the applied methodology VM0050 v1.0:

1) The methods for measuring, recording, storing, aggregating, collating and reporting on monitored data and parameters:

The Project Proponent (PP) shall maintain a comprehensive project database that records all distributed cookstoves and is updated with replacements and monitoring survey data. This database will be accessible to the PPs, relevant partners, and the verification VVB and will serve as the basis for selecting random, representative samples for monitoring and verification.

At a minimum, the database will include:

1. Date of sale
2. Geographic area of sale
3. Model/type of project technology sold/distributed
4. Name, telephone number (where available), and address of recipient; and
5. Unique alpha/numeric ID for each device that is sold/distributed

Monitoring surveys, can be conducted by external third parties or the PP's own teams, will verify stove installations and operational status. Survey data will be compiled in Excel spreadsheets and used to estimate proportions and mean values of key parameters. These values will be factored into emission reduction calculations, ensuring compliance with VM0050 v1.0. Additionally, all monitoring equipment will be regularly calibrated, with records maintained for verification.

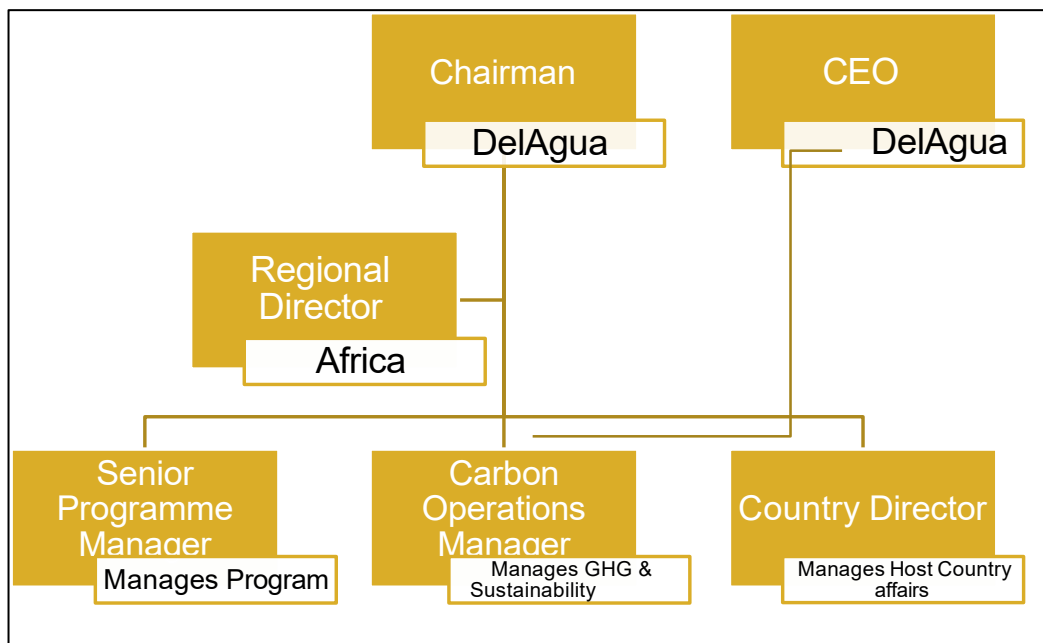
Data recorded during monitoring surveys will be collected electronically and securely stored before being uploaded to a central database management system, hosted online via a subscription-based server.

To ensure data security, all information will also be stored offline on hard disk drives. The project follows a fully digital data collection process, eliminating paper records to minimize the environmental footprint.

All project-related data will be securely maintained for at least two years after the completion of the implementation period for the project activity.

2) **The organizational structure, responsibilities and competencies of the personnel that will be carrying out monitoring activities:**

Team Involved: The DelAgua team involved in the GHG operations management is the local staff based in The Gambia along with the senior management.



The key responsibilities are shared by the team as follows:

Roles and Responsibility:

Chairman – Supervises the overall programme at strategy and financial side.

COO – Acts as central point of strategy, programme management, finance, and technical domains of the programme.

Regional Director – Responsible for the regional level programme implementation and expansion planning and implementation

Senior Programme Manager – Manages the programme at implementation level and acts as an internal technical reviewer for the programme documents and procedures.

Carbon Operations Manager – Manages the operations for GHG emission mitigation programme, from planning to implementation stage. Additionally, manages the Sustainability aspects of the programme.

Country Director – Supports programme in the operations and management at the host country level and acting as point of communication between DelAgua and government of The Gambia.

The collective responsibilities of DelAgua as the Project Participant will be the following:

- Acts as the project managing entity
- Development of PD
- Registration/Issuance of the project with VERRA
- Inclusion of new PAIs upon satisfaction of the eligibility criteria stipulated in the PDD
- Authorized entity for any official communication with the VERRA and VVB
- Manage and archive the database for all appliances
- QA/QC of database during distribution & data collection
- Maintain local repair/replacement facilities
- Education and public awareness raising during initial distribution as well as periodic education campaigns.
- Data collection during distribution & delivery of data to database
- QA/QC of data collection
- Conduct ongoing monitoring, as required to ascertain monitored parameters

3) The procedures for internal auditing and QA/QC:

Spot checks of the database are conducted during the baseline surveys, distribution, and monitoring activities. Distributors are trained in the proper installation, use, and maintenance of the devices, and are provided with training sufficient to introduce recipient households to the proper operation and maintenance of the devices, as well as contact information for DelAgua. Supervisors receive similar training, as well as supervisory training in monitoring of distributor's activities. Supervisors are responsible for approximately 10 distributors. During the campaign, DelAgua staff will spot-check distributor quality, by revisiting 2 households per distributor, to verify that the stoves are in place, and that the recipient can show proper operation of the units. The results of this spot check are recorded electronically and compared against the initial distribution logs. The data collected in the database is verified and controlled in the following way:

- i. Surveys are conducted by staff trained by DelAgua.
- ii. Supervisors are separately trained by DelAgua to spot-check surveyor results.
- iii. All ex-ante and monitored data parameters are collected on smart phone-based surveys and are uniform across all surveyors for any given survey activity.
- iv. Unknown to the surveyors, the database analysis includes verification of "valid" surveys including by a.) verifying household consent is received and b.) that the survey duration, as recorded by Internet time, is no shorter or longer than a reasonable value. For example, the baseline surveys for Gambia were validated against a minimum of 20 minutes and a maximum of 120 minutes.
- v. Data validation is conducted on the database to ensure that values are numerically consistent, i.e. multiple-choice values add up to 100% of respondents.

4) The procedures for handling non-conformances with the validated monitoring plan

The project proponent ensure that field personnel have reviewed, understood and have agreed to follow the monitoring plan procedures, including provisions for maximizing

response rates, documenting out-of-population cases, refusals and other sources of non-response. To reduce interviewer bias, good questionnaire design and well-tested questionnaires are developed.

DelAgua is responsible for training any contractors used during distribution, education, and monitoring activities. DelAgua ensures training of all on-site staff with respect to adherence to the Monitoring Plan of the project activity. Records of the training will be kept. Training records are saved for such training programs, where step-by-step training is provided to the surveyors for a quality data collection process, where they are expected to not impact the materially, degree of conservativeness, and perform the surveys in an unbiased manner. The surveyors are trained on a periodic basis, and refresher trainings are also provided to improve the quality of surveys from time to time. During these audits all the data and parameters that need to be monitored as per the monitoring plan will be checked and shortcomings if any will be reported and addresses. Since the surveys are electronic in format, recording of responses and the record keeping procedure for these surveys are conveyed to the team through rigorous trainings.

The modules for training of resources will be revised on a periodic basis, accounting for the need-based improvements in the training programs or the procedural requirements.

Deviations or errors in data collection are logged and reviewed, with supervisors conducting spot checks to ensure compliance. Corrective actions, such as re-training or additional surveys, are taken if non-conformances are found.

By integrating rigorous training, continuous oversight, and corrective measures, the project ensures that all monitoring activities align with the validated Monitoring Plan, maintaining data accuracy, credibility, and compliance.

5) Sampling Plan:

PP follows the sampling approach outlined below, which is in line with the most recent version (v9.0) of the CDM Standard for Sampling and Surveys for CDM Project Activities and Programmes of Activities:

Due to the large number of ICS envisioned to be distributed as part of the project activity, it is not economically feasible to monitor each individual ICS unit distributed. Therefore, representative sampling will be undertaken as part of a cross-PA sampling Plan in line with the requirements of the methodology applied and the Standard: Sampling and surveys for CDM project activities and programmes of activities, version 9.0.

Sample sizes will be sufficient to ensure that the precision of the sample means/proportions are in accordance with the methodological / standard requirements. In cases where survey results indicate that desired precision is not achieved, the lower bound value of the corresponding confidence interval of the parameter value may be used as an alternative to repeating the survey. Alternatively, the survey may be expanded to reach the required confidence/precision.

The sampling methodology will be in accordance with the representative sampling methods provided by the sampling guidelines and standards as indicated along this section, with the applied methodology having precedence

Sampling Objectives - The sampling objective for each parameter is to determine, via sampling survey, a statistically significant parameter value for the emission reduction calculations. These parameters are as listed in section 5.2:

No	Monitoring Parameters	Sampling Parameters	Parameter type	Monitoring frequency
1	$\eta_{j,k,y}$	Proportion of commissioned project devices of type j from batch k that remain operating in year y	Proportion	Annually
2	$\eta_{new,avg,y}$	Weighted average efficiency of project devices in year y	Mean	Annually
3	$BC_{b,i,y}$	Fuel used per baseline device type i during year y	Mean	Every five years
4	$BC_{p,j,k,y}$	Average quantity of fuel used by project device type j from batch k during year y	Mean	Biennial /annual

Field Measurement Objective and data to be collected – As listed in Section 5.2 above

Target Population and sampling frame – The target population is the total population served under the grouped project, and the sampling frame consists of aggregated data of end-users of the ICS as recorded in the GP Databases. The sampling frame will be kept for 2 years following the crediting period or the last issuance of the VCU of the project activity.

Sample Method - Sampling will be conducted using stratified random sampling techniques¹⁴ over the sampling frame, and detailed calculations are provided below as per CDM guidelines “Sampling and surveys for CDM project activities and programmes of activities” the ICS in the sampling frame shall be stratified as per parameters requirements.

Stratified Random Sampling will be used to select samples from the Project Database for monitoring parameters.

Optionally, other sampling approaches may be used in accordance with Standard “Sampling and surveys for CDM project activities and programmes of activities” and Guideline for Sampling and Surveys for CDM Project Activities and Programme of Activities when sampling techniques or statistical analysis necessitates it. Sampling will be independent of investment groups, as it pertains only to stove model and vintage in line with the applied methodology; investment groups are considered for internal purposes and to meet investor

¹⁴ Other Sampling approaches may be applied during the course of crediting period, in case needed.

expectations. However, the PP may choose to consider investment groups in sampling for future verifications, though it will not be binding.

To ensure a random selection of ICS, random number generators shall be applied. Each ICS in the target population is uniquely identifiable by its unique ID number. Each ICS can thus be allocated a Sample Selection Number in each monitoring period, starting at 1 and increasing up to the total number of ICS in the Database for that pre-defined sampling frame.

Applying the random number generators, the ICS was then randomly chosen from the defined population up to the required sample size as calculated by the project proponent.

The sample size shall be determined using the following formula:

$$n \geq \frac{z^2 * N * V}{(N-1) * precision^2 + z^2 * V}$$

Where,

n = number of ICS to be sampled

N = Total number of ICS in the population

Z = Constant referring to level of confidence (1.96 for 95 %, 1.646 for 90%)

Precision = Required precision (e.g., 10% = 0.1)

Where for proportion-based parameters:

$$V = \frac{SD^2}{p}$$

$$SD^2 = \frac{\sum_{i=1}^k g_i * p_i * (1 - p_i)}{N}$$

$$\bar{p} = \frac{\sum_{i=1}^k g_i * p_i}{N}$$

Where,

SD² = Weighted Overall Standard deviation

g_i = weight of strata i in the population

p_i = expected proportion of strata i in the population

k = total number of strata in the population

And for mean-based parameters:

$$V = \frac{SD^2}{mean^2}$$

$$SD^2 = \frac{\sum g_i \times SD_i^2}{N}$$

$$mean = \frac{\sum g_i \times m_i}{N}$$

Where,

Mean = weighted overall mean

m_i = Mean of strata i

In the case of parameters monitored for the first time the expected variation for that measure in the sample may be based on results from similar studies, pilot studies, or from the project planner's own knowledge / experience of the data.

The data will be collected using surveys carried out either by external third parties or by project implementer teams. Data collected from the surveys will be compiled into an Excel spreadsheet.

Data obtained from the samples will be used to estimate proportions and mean values for the parameters described above. The values will then be factored into the emissions reduction calculations.

During sampling, there may be non-response from the target population. Over-sampling may be used to avoid non-response; however, sampling may be ceased once required confidence/precision is met.

The PP may not do cross-PA sampling and rather conduct separate sampling and monitoring for each PA. In such a case, the approach defined above shall be applied to each PA, albeit with 90/10 confidence / precision levels for annual sampling and 95/10 for biennial sampling (instead of 95/10 for annual/biennial sampling for cross-PA sampling).

Similarly, for fuel measurement campaigns, sample sizes may be alternatively determined as per the available KPT protocols.

APPENDIX 1: COMMERCIALLY SENSITIVE INFORMATION

No information presented in the document is deemed commercially sensitive.

APPENDIX 2: FNRB CALCULATION

Step 1: Estimation of renewable biomass (RB) in the country of The Gambia as per equation (4) of the fNRB tool

$$RB = \sum (MAI_{forest,i} \times (F_{forest,i} - P_{forest,i})) + \sum (MAI_{other,i} \times (F_{other,i} - P_{other,i})) \quad \text{Equation (4)}$$

Where:

- $MAI_{forest,i}$ = Mean Annual Increment of woody biomass growth per hectare in sub-category i of forest areas in the relevant period (tonnes/ha/yr)
- $MAI_{other,i}$ = Mean Annual Increment of woody biomass growth per hectare in sub-category i of other land areas in the relevant period (tonnes/ha/yr)
- $F_{forest,i}$ = Extent of forest in sub-category i in the relevant period (ha)
- $F_{other,i}$ = Extent of other land in sub-category i in the relevant period (ha)
- $P_{forest,i}$ = Extent of non-accessible area (e.g. protected area where extraction of wood is prohibited, geographically remote area) within forest areas (in sub-category i) in the relevant period (ha)
- $P_{other,i}$ = Extent of non-accessible area (e.g. protected area where extraction of wood is prohibited, geographically remote area) within other land areas (in sub-category i) in the relevant period (ha)
- i = Sub-category i of forest areas and other land areas³

Parameters used:

Input parameter	Value	Data source
Forest	300,000	Geospatial data products for Gambia were analysed in R14–18 to estimate The Gambia's renewable biomass. The forest and other wooded land cover for 2000 and 2021 was estimated using Hansen/UMD/Google/USGS/NASA ¹⁵ spatial data for 2000 and 2021, which is derived from Hansen et al. ¹⁶ , and disaggregated according to the FAO ¹⁷ global ecological zones. The total woody cover extent, including forests and other wooded areas, was calculated for each ecological zone, within the protected areas and within areas that are either accessible or geographically remote.
Extent of forest and other wooded land in 2021	(in ha)	
Protected Areas	(in ha)	
Protected areas within forest areas	117,138	
Remote areas within forest areas	278,681	
Mean Annual Increment (MAI)	In t/ha/year	
Tropical dry Forest	1.60	The mean annual increment for forest is calculated as weighted average of the forest
Tropical moist forest	0.90	

¹⁵ Hansen/UMD/Google/USGS/NASA. Hansen Global Forest Change v1.9 (2000-2021).

¹⁶ Hansen, M. C. C. et al. High-resolution global maps of 21st-century forest cover change. *Science* (80-.). **342**, 850–854 (2013)

¹⁷ FAO. *Global Forest Resources Assessment*. (2015)

		type and their MAI as per IPCC ¹⁸ values for Tropical moist forest, Tropical Mountain system and tropical rain forest.
Wood density	0.725 t/m³	FAO ¹¹

Geographically remote areas were determined to be areas beyond a harvestable distance from roads and settlements. Conservatively, it was assumed that forests and wooded areas adjacent to all roads within a distance of 2.5 km are harvestable, despite how geographically remote or inaccessible these roads may be. This threshold was determined based on the peer-reviewed literature on wood harvesting practices.

Banks et al.¹⁸ found that woody biomass density increases significantly as a function of distance from the edge of a settled area. Beyond 450 m, average biomass density was found to increase from 2.1 to 16.6 t/ha. Jumbe and Angelsen¹⁹ modelled fuelwood choice from household survey data. They found that the most significant determinants of fuelwood choice are source attributes (size and species composition) and distance to source. The mean harvesting distance for their study was found to be 0.95 km. Bandyopadhyay et al.²⁰ matched household survey and remote sensing data to investigate wood fuel use in relation to poverty levels. They concluded that the one-way walk duration to wood fuel source for both poor and non-poor households is 0.6 hours. Assuming an average walking speed of 4 km/hr over uneven terrain, the average one-way distance to wood fuel source is less than 2.5 km. Areas beyond the harvestable distance were, therefore, determined to be geographically remote. Accessible areas are those that are not protected and not geographically remote, from which the annual renewable biomass production is calculated.

The default age-weighted mean annual increment (MAI) estimates of each ecological zone, as reported by the IPCC, were used for this study. The proportion of forest stand ages above and below 20 years old, including primary forests, were estimated for each ecological zone by extrapolating the observed forest gain extents between 2000 and 2012 to a 20-year period.

The average MAI estimates for The Gambia are 0.92 and 1.60 t/ha/year for tropical dry forests and tropical moist forest, respectively between 2000 and 2012 to a 20 years period.

FAO Global Ecological Zone	Total forest cover (ha)	Protected area cover (ha)	Remote area cover (ha)	MAI (t/ha/yr)	Annual growth (t/yr)
Tropical dry forest	31,837	70	1,586	1.60	48,290
Tropical moist forest	57,217	3,096	2,453	0.90	46,425
Total	89,054	3,166	4,039	-	94,715

Total renewable biomass RB = 94,715 t/year

Step 2: Estimation of consumption of woody biomass (H) in the country of The Gambia as per equation (2) of the fNRB tool

¹⁸ IPCC. Forest Land. 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4: Agriculture, Forestry and Other Land Use 4, 1–29 (2019)

¹⁹ Jumbe, C. B. L. & Angelsen, A. Modeling choice of fuelwood source among rural households in Malawi: A multinomial probit analysis. *Energy Econ.* **33**, 732–738 (2011).

²⁰ Bandyopadhyay, S., Shyamsundar, P. & Baccini, A. Forests, biomass use and poverty in Malawi. *Ecol. Econ.* **70**, 2461–2471 (2011)

$$NRB = H - RB$$

Where,

H = Total consumption of woody biomass in the applicable area in the relevant period (tonnes)

$$H = HW \times N + CE + NE$$

Where,

HW = Average consumption of wood fuel per household, including fuelwood and charcoal, in the applicable area in the relevant period (tonnes//household)

N= Number of households consuming wood fuel within the applicable area in the relevant period (number)

CE= Commercial woody biomass consumption for energy applications (e.g. commercial, industrial or institutional uses of woody biomass in ovens, boilers etc.) that are extracted from forests or other land areas in the applicable area in the relevant period (tonnes)

NE= Commercial woody biomass consumption for non-energy applications (e.g. construction, furniture) that are extracted from forests or other land areas in the applicable area in the relevant period (tonnes)

The total woody biomass consumption combines the country's domestic and non-domestic *energy* and non-domestic *non-energy* consumption. The Gambia's estimate of total woody biomass consumption estimation is derived from World Bank population statistics²¹ and consumption data sourced from literature^{22,23} and the FAO²⁴ data. Reported values of charcoal consumption are converted to the equivalent woody biomass using guidelines on kiln efficiency from the FAO forestry paper on industrial charcoal making²⁵ and the latest CDM Tool 30 v04.0 2022 default charcoal-to-wood biomass conversion factor. The CDM default value of 4 was applied to the urban domestic charcoal consumption and non-domestic energy charcoal consumption.

Data was drawn from the most recently available official reports/statistics, in this case from the UN's Statistics Division to demonstrate both the recent trend in increase of wood fuel use at the household level, plus also the most recently available data (from 2021). This increase in fuelwood use at the household level has had a significant impact on the parameter value fNRB. The density of fuel is not a time bound parameter, hence average of Africa is used as per published data by FAO.

Input parameter	Value	Data source
H (in t/year)	9,46,100	Calculated (2021)
Wood density (in t/m ³)	0.725	FAO
HW woody biomass consumption in households (in t/year)	600,409	Calculated

21 UCLouvain. ESA CCI Land Cover Maps v2.1.1. (2019)

22 United Nations & African Union. Review of woodfuel biomass production and utilization in Africa

23 FAO. Forestry Sector in 2020

24 FAO Statistics. Forest Products 2019. <https://www.fao.org/3/cb3795m/cb3795m.pdf> (2021)

25 CDM. CDM Methodological tool 33: Default values for common parameters. Version 02.0.

<https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-33-v2.0.pdf> (2022)

CE Non domestic woody biomass consumption for energy application (in t/year)	308,380	Calculated, using biomass expansion factor 1.040 ²⁶
NE Non domestic woody biomass consumption for non-energy application (in t/year)	37,311	Calculated using biomass expansion factor 1.040
Population of the country	2,486,937	World Bank

Equation (3) of the fNRB tool stipulates that the average household wood fuel consumption is multiplied with the number of households and industries consuming wood fuel for energy and non-energy applications within the country. Since most of the available and reliable data is total wood fuel consumption in households and commercial and other use.

The total population of host country has been sourced as per the published World Bank population data from 2021. This is in line with the fNRB tool.

Step 3: Estimation of quantity of non-renewable biomass (t/year) as per equation (2) of the fNRB tool

$$NRB = H - RB$$

Where,

H = Total consumption of woody biomass in the applicable area in the relevant period (tonnes)

This step calculates the quantity of non-renewable biomass (t/year) (NRB) by subtracting the renewable biomass estimated in step 1 from the total consumption of woody biomass estimated in step 2. No further input parameters are needed under this step.

$$NRB = 946,100 - 94,715$$

$$NRB = 851,385 \text{ t/year}$$

Step 4: Estimation of fraction of woody biomass that can be established as non-renewable (fNRB) as per equation (1) of the fNRB tool

$$fNRB = \frac{NRB}{NRB + RB} \quad \text{Equation (1)}$$

This step calculates the fraction of woody biomass that can be established as non-renewable (fNRB). The non-renewable biomass calculated in step 3 is divided by the sum of non-renewable biomass and renewable biomass calculated in step 1. No further input parameters are needed under this step.

$$fNRB = 851,385 / (851,385 + 94,715)$$

$$fNRB = 90\%$$

26 FAO. Global Forest Resources Assessment, Country Report - Gambia. (2020).

Step 5: As per para 6 of CDM tool 30, the resulting non-renewable biomass (NRB) was compared to the top-down product of average above-ground biomass (41.80 t/ha) and the most recent annual deforestation data (5,730 ha/yr)²⁷. NRB, as calculated in this report according to the CDM Tool 30 v4.0 2022, was found to be 851,385 t/yr, greater than the cross-check results based on deforestation (239,514 t/yr). It is expected that the cross-check estimate of biomass loss from deforestation could underestimate the extent of non-renewable biomass consumption as it only considers the average biomass stocks from completely deforested areas. Unsustainable wood harvesting resulting in forest degradation and substantial reductions in biomass stocks, but not complete deforestation, are not considered in the cross-check. Therefore, the estimate of NRB is deemed applicable to this study, given that the guidance provided by CDM Tool 30 v4.0 2022 was followed.

The resulting fNRB value is higher than expected fNRB values determined using the WISDOM method as reported by Bailis et al., 2015²⁸ for the same region. While direct comparisons between the WISDOM and CDM methodologies are only sometimes appropriate given the different approaches of the methodologies, the following factors can contribute to variations in the fNRB estimates between the two methods:

1. More recent population statistics (2021)²⁹ for The Gambia were used in the present study. The more recent data represents a 42% increase in population numbers since the 2009 data utilised by Bailis *et al.*, 2015.
2. The total woody consumption estimated for the country in the present study utilises the 2021 population statistics in combination with 2019 per capita consumption values sourced from the FAO Forest Products 2020 report³⁰ accounting for a 12% increase in total woody consumption when compared to forest products data for 2013³¹, as used in the study reported by Bailis et al., 2015
3. Mean annual increments (MAI) were calculated by means of a weighted average that is based on the forest area of three categories (i.e., primary forests, above and below 20 years secondary forests). Data from the 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories for “Above-ground biomass growth rates for different ecological zones” was utilised³². As per the Bailis *et al.*, 2015 article, MAI values were derived from field observations followed by an estimation of growth rates as a percentage of standing stock and IPCC values. This approach yields higher MAIs compared to IPCC values leading to lower estimations of non-renewable biomass (NRB).

The calculated fNRB value of 0.90 indicates that Gambia’s woody biomass consumption exceeds the country’s capacity to renew the supply sustainably. This finding is supported by the consistent and widely reported deforestation rate and dynamics observed for the country³³.

²⁷ FAO. *Global Forest Resources Assessment, Country Report - Gambia*. (2020).

²⁸ Bailis, R., Drigo, R., Ghilardi, A. & Masera, O. The carbon footprint of traditional woodfuels. *Nat Clim Chang* 5, 266–272 (2015)

²⁹ The World Bank. *World Bank Open Data*. Accessed on 05/05/2022 from <https://data.worldbank.org/> (2022)

³⁰ FAO Statistics. *Forest Products 2019*. <https://www.fao.org/3/cb3795m/cb3795m.pdf> (2021).

³¹ Food and Agriculture Organization of the United Nations. *FAO yearbook : forest products 2009-2013*. (2013)

³² IPCC. *Forest Land. 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4: Agriculture, Forestry and Other Land Use 4*, 1–29 (2019)

³³ FAO. *Global Forest Resources Assessment 2020: Main report*. Rome <https://doi.org/10.4060/ca9825en> (2020).