PLANETE URGENCE
Groupe SOS

CAMEROON MANGROVE ECOSYSTEM RESTORATION & RESILIENCE (CAMERR)

CAMERR

Monitoring Plan

Crediting period: 2022-2062

VCS ID 4845

Latest update: October 2025

Planète Urgence - Association reconnue d'Intérêt Général
15 rue de la Fontaine au Roi - 75011 PARIS - Tél. : 01 58 30 51 10 – www.planete-urgence.org
Siret : 433 095 718 000 30

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1. Monitoring Framework

This monitoring plan outlines the procedures and methodologies used to quantify and report carbon stock changes and greenhouse gas (GHG) emissions reductions from the project, in accordance with the VM0033 methodology, as well as sustainable development contributions in line with the UN Sustainable Development Goals (SDGs). It draws on standard protocols and best practices, including the 2003 IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry (GPG-LULUCF).

Monitoring will be conducted at each verification event and includes:

- Field-based measurements of key carbon pools (e.g., aboveground biomass, soil carbon)
- Application of QA/QC procedures to ensure data accuracy and consistency
- Use of standardised SOPs and documented methodologies for data collection and processing

1.1 Organizational structure

The organizational monitoring structure for the CAMERR project is designed with multiple tiers to ensure effective oversight and compliance with VM0033 and VCS rules and requirements.

1.1.1 Tier 1: Strategic Oversight

At the highest level, Planète Urgence's Climate Manager, supported by an external carbon consultancy, is responsible for ensuring that the monitoring framework aligns with VM0033 and VCS requirements. This tier provides strategic guidance, translates technical monitoring requirements into actionable protocols, and supports overall compliance and methodological integrity.

1.1.2 Tier 2: Coordination and Verification

The CAMERR Project Manager leads Tier 2, coordinating implementation across all partner NGOs. Key responsibilities include:

- Ensuring timely execution of project activities and appropriate resource allocation
- Facilitating collaboration and information flow among partner organizations
- Conducting regular field audits to verify adherence to the monitoring plan
- Ensuring consistency between on-the-ground activities and the overall project framework

1.1.3 Tier 3: Field Implementation

Each partner NGO is responsible for field-level implementation through a dedicated team, led by its own Project Manager. These teams carry out technical activities such as:

- Planting activities
- Community engagement and outreach
- Environmental education and awareness

The implementing project managers are accountable for implementing project activities and for adhering to the monitoring plan.

Implementing Partner Teams 2025		
CAMECO	**WTG**	**CWCS**
Director	Director	Director
Project Manager	Project Manager	Project Manager
Accounting Assistant	Accounting Assistant	Accounting Assistant
Technical Assistants	Technical Assistants	Technical Assistant
Community Facilitators	Community Facilitators	Community Facilitators

Figure 1: Implementing Partner Teams.

This multi-tiered structure ensures clear communication, accountability, and compliance with the VM0033 methodology and the VCS Standard requirements at every level of the project.

1.2 Project Boundary and Sampling Framework

During the project preparation stage, field surveys and ground truth mapping were conducted to confirm the project boundaries. Satellite data and land use maps were used as key references to ensure accuracy. The project areas are stratified based on the year of implementation. While the maps created during the ex-ante phase are not expected to change, they will be updated following each planting campaign to reflect the total surface area restored.

The project will follow the AR Methodological Tool 03, Version 2.1: “Calculation of number of sample plots required for estimation of biomass stocks from sampling-based measurements in the baseline and project scenarios of an A/R CDM project activity” to determine the required number of sample plots.

To ensure an even distribution and adhere to common practices in forest and vegetation inventory, a stratified random sampling method will be employed. It is anticipated that the sampling design will be stratified by planting year and well as the level of forest degradation as identified during the baseline forest inventory stratification. The number of plots will then be adjusted based on the size of the restored land parcels, with permanent sample plots randomly established within each parcel.

The sample plots will serve to monitor carbon stock changes, ensuring the required level of precision specified by the methodology. CDM AR Tool 03 specifies a minimum uncertainty level of 10% at a 90% confidence interval. However, the minimum threshold for total project uncertainty under VM0033 can either be 20% at a 90% confidence interval, or 30% at a 95% confidence interval. During the monitoring phase, and in preparation for first verification, an uncertainty level of 10% (at 90% confidence interval) will be targeted to ensure that the total project uncertainty remains well below the maximum uncertainty of 30% at a 95% confidence interval.

As planting activities only began in 2022, and is still ongoing (until 2027), the exact number of sample plots has not yet been calculated, nor have any permanent sampling plots been established for the

monitoring phase. The final number of permanent sample plots will be determined during the first verification and reported at the end of the first monitoring period.

1.3 Plot-based measurements

Rectangular, permanent sample plots measuring 0.04ha in size will be randomly allocated to each stratum within the project area using QGIS software. This work will be performed by a trained GIS analyst and the final number of sampling plots will be completed in accordance with CDM A/R methodological tool 03 ‘’Calculation of the number of sample plots for measurements within A/R CDM project activities’’ version 2.1.

The methods employed for the establishment of permanent sample plots within the project area will mimic those employed during the baseline forest inventory. An indicative sample plot design for the establishment of permanent sample plots is shown in Figure 2 below.

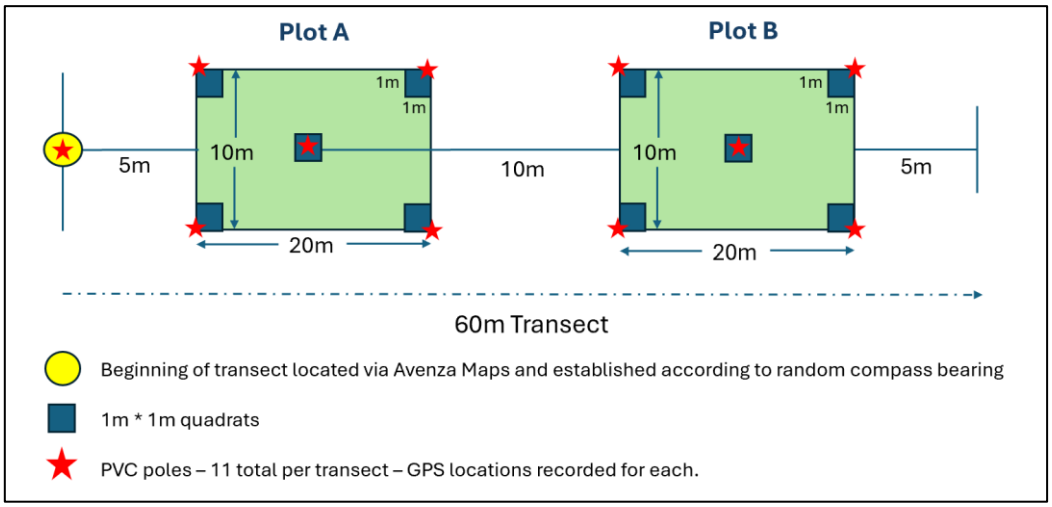

Figure 2. Indicative permanent sample plot design for monitoring of project performance

Prior to the commencement of the forest monitoring inventory at each verification event, team members will be required to participate in desk-based and field-based training which will be led by experienced foresters with demonstrable expertise in mangrove ecology and forestry. Inventory teams will geo-locate plots using GPS devices and the Avenza smartphone application. Once on site, teams will ensure that the plot center is marked according to a designated numbering system that corresponds to the randomly allocated number allocated by QGIS analysis. In each sampled plot, the diameter at breast height (dbh) of all trees within the selected sample plots will be measured directly by the implementation team with calipers and dbh tapes. Further, canopy cover (%) of shrub biomass will be recorded within each plot in accordance with section 5 (13) of CDM AR Tool-14 the requirements.

Once collected, the data will be transferred to electronic format, where dbh measurements will be converted to biomass (t.d.m) estimations (AGB and BGB) via the allometric equations and associated parameters identified for the project. Quantification of net GHG removals (t.CO_2e) in stratum *i* at time *t* will follow the methods and equations specified in CDM AR-Tool14. Data analysis will be performed with the R statistical software or with Microsoft Excel. Results and reporting of data at first verification

will conform to the requirements and formatting of the latest available VCS template monitoring report (currently v4.4).

Additional information regarding collating, storing and quality assurance procedures for monitored data at each verification event are discussed in the section below.

1.4 Data Collection

In each permanent sample plot established within the project area, the following procedure for data collection will be followed:

- Navigate to plot location using geo-located PDF map of project zone uploaded to smartphone application, Avenza Maps
- Install PVC pole (1.5m) at the beginning of transect, register first GPS waypoint, and attach transect tag
- Establish a 60m transect according to the list of random compass directions allocated prior to the commencement of the inventory. If the designated compass direction is not feasible due to natural barriers (e.g., waterways) then the next direction, in sequential order, may be selected.
- Install PVC poles (1.5m) at the corner of each of the two, 10m x 20m plots (A and B), measured and installed via a perpendicular compass direction to that of the transect (see Figure 2 above).

Record diameter at breast height (dbh) and height measurements for all tree species within each 10 * 20m plot nested within the 60m long transect[1]

1.5 Procedures for internal auditing and QA/QC

As outlined in the VM0033 methodology, quality management procedures are essential for the handling of data and information, including the assessment of uncertainties related to both the project and baseline scenarios. To guarantee that carbon stock estimates are accurate, verifiable, transparent, and consistent across measurement periods, Quality Assurance (QA) and Quality Control (QC) procedures have been established. A summary of these procedures is provided below:

Table 1: Data Collection Standard Operating Procedures.

Steps to Follow	Explanation of the procedures

[1] The finalised design of plot-based measurements I subject to change depending on the location of PSPs to consider the distance that can be travelled by boat in one day. The objective remains to not leave sampling transects half-completed at the end the field day.

Collecting reliable field measurements	To ensure high-quality, consistent data collection, all field staff will undergo structured training before each monitoring event. The process includes both classroom instruction and hands-on field practice, supervised by project leads. **Monitoring Preparation and Training Process:** 1. **Team Composition** ○ Includes staff experienced in mangrove restoration, research, and data collection. 2. **Pre-Monitoring Training (Classroom Session)** ○ Reviews objectives, protocols, and procedures ○ Provides Q&A session for clarity ○ Attendance recorded; participants confirm understanding 3. **Field Practice (1 Day)** ○ Full team applies methods in the field across all forest strata 4. **Supervision and Quality Control** ○ Project Manager and Inventory Leader oversee training and fieldwork ○ Ensure standardisation across teams 5. **Skill Verification** ○ Team members must demonstrate proper use of field equipment (e.g., DBH tape)
Clear and effective communication	Clear and consistent communication is essential to minimize errors and ensure effective coordination during data collection. A structured communication plan will support real-time collaboration and problem-solving throughout each monitoring campaign. **Communication Plan During Monitoring Events:** 1. **Dedicated WhatsApp Group** ○ Created before each monitoring event for all field team members ○ Used to: ▪ Share daily plans and coordinate logistics ▪ Provide updates and progress reports ▪ Send photos or documentation ▪ Ask questions and get clarifications in real time 2. **Offline Communication** ○ In areas with no internet access, updates/questions will be shared once the team returns to connectivity (e.g., in the evening) 3. **Daily Debriefings** ○ Inventory Leader meets with team leaders at the end of each day ○ Reviews progress, addresses concerns, and discusses any issues that arose
Verifying the methods used to collect field data	To ensure data accuracy and methodological consistency, a robust verification and oversight process will be implemented throughout the inventory. **Data Verification & Oversight Procedures:** 1. **Plot Re-Measurement** ○ Plot re-measurements will be in line with methodological requirements. QA/QC plots will be re-measured by different team members to verify accuracy. 2. **Inventory Leader Oversight**

	○ Rotates among teams to: ▪ Monitor consistency of methods ▪ Address technical or forestry-related questions in real time **3. Daily Morning Meetings** ○ Led by the Inventory Leader ○ Reinforce methods and address any emerging concerns **4. Field Protocol Access** ○ All technicians must carry a physical and/or digital copy of the Forest Inventory Protocol for reference during fieldwork
Verifying data entry and analysis techniques	To maintain data integrity, all field data, whether recorded on paper or using offline digital tools, is subject to rigorous verification at every stage of the data handling process. **Data Quality Assurance & Verification Procedures:** 1. **Field-Level Verification (Daily)** ○ Team leaders verify accuracy and legibility of manually recorded data at the end of each sampling day or as soon as possible ○ Team leader and scribe conduct a debrief to: ▪ Review all data sheets ▪ Re-write unclear sections (e.g., due to rain or poor handwriting) ○ All sheets are handed to the Inventory Leader for a secondary QA/QC check ○ Issues are addressed the same day with the scribe or team leader **2. Digital Data (e.g., Kobo Toolbox)** ○ Team leaders upload completed digital forms to a shared cloud folder once connected to a network ○ QA/QC checks are performed by both the team leaders and Inventory Leader **3. Data Entry & Management** ○ Two designated Data Managers: ▪ Enter manual data into Excel during the inventory process ▪ Cross-check each other's work for transcription errors ▪ Upload final datasets to a Microsoft SharePoint and/or google drive folder **4. Issue Escalation & Resolution** ○ Data inconsistencies flagged by Data Managers are escalated to the Inventory Leader ○ Inventory Leader verifies raw sheets or digital forms and provides clarification ○ Unresolvable data issues result in exclusion of affected data to preserve analysis quality
Presentation of findings to Project Manager and Field Staff	After data analysis is complete, results will be reviewed collaboratively to ensure accuracy and alignment with field conditions. **Post-Analysis Review Process:** 1. **Results Sharing** ○ Findings are presented to the Project Manager and field staff **2. Collaborative Review**

	○ Team discusses outcomes to confirm that analysis reflects on-the-ground realities ○ Field insights help validate and refine interpretation of results **3. Final Quality Check** ○ This step adds an extra layer of QA/QC, improving overall reliability of the findings
Data maintenance and archiving	To preserve the integrity and accessibility of project data, proper maintenance and archiving protocols will be followed. **Data Storage & Archiving Procedures:** **1. Physical Records** ○ Hard copies of field data will be securely stored at Planète Urgence's office in Douala **2. Digital Records** ○ All electronic materials, including: ▪ Scanned data sheets ▪ Analyses and models ▪ Carbon stock estimates ▪ GIS outputs and other relevant files ○ Will be stored in a secure, cloud-based system with controlled access

1.6 Procedures for handling non-conformances

Although a rigorous quality assurance and quality control process has been established to ensure accuracy and compliance, any non-conformance that may occur will be addressed through the following steps:

- *Identification:* Non-conformances are identified through internal audits or during regular monitoring activities.
- *Correction:* Corrective actions are implemented immediately, with re-training of personnel if needed. Data collected during periods of identified non-conformance may be re-collected or flagged as unreliable.
- *Documentation:* All non-conformance incidents and corrective actions are logged in a non-conformance register, with detailed documentation available for auditors

2. Monitored Parameters

2.1. Data and Parameters Available at Validation

Table 2: Data and Parameters Available at Validation.

Description	Source	Value Applied	Rationale for data and methods	Purpose of Data	Comment
Area of baseline stratum	GIS-based stratification of the project area combined with ground-based identification of project areas.	Stratum 1: 372.38 Stratum 2: 682.91 Total: 1055.29	Before the October 2024 baseline inventory, the area was stratified using NDVI data to support GHG estimates, defining semi-degraded (NDVI ≥ 0.73) and degraded (NDVI < 0.73) strata. To reduce cloud cover effects, dry season imagery (Jan–Mar 2024) was used for 2025–2027 zones, and May 2021 imagery for 2022–2023 zones.	Calculation of baseline emissions	N/A
Carbon fraction of dry matter	Default value from VM0033	Above ground biomass and below ground biomass: 0.47 t C. t-1 d.m.	A conservative default value was applied, lower than the 0.49 t C/t d.m. value from the 2013 IPCC Wetlands Supplement.	Calculation of baseline emissions Calculation of project removals	N/A
Change in carbon stock in baseline tree biomass within the project area in year t	Above- and belowground biomass of Pandanus candelabrum is calculated using Ajonina et al.'s (2024) allometric equation per CDM AR-Tool 14.	Total Biomass (AGB and BGB) = 0.00003 * (DBH2 * H) (Ajonina, 2024)	Only *Pandanus candelabrum* biomass is included in baseline emissions, based on inventory data, successional trends, and Ajonina (2024), as other species remain untouched under the project.	Calculation of baseline emissions	Calculations are done for each stratum i Reassessed when baseline is reassessed
Carbon stock in shrub vegetation in the baseline and project scenario in stratum i in year t	CDM AR-Tool14 (Eq. 26 & 27)	ΔCBSL-SHRUB,i,t,: Stratum 1: 2.45 t.C.ha-1 Stratum 2: 0.52 t.C.ha-1	Ocular estimation was used to estimate the crown cover of shrub biomass within each transect in the baseline forest inventory. The percentage (%) of shrub	Calculation of baseline emissions Calculation of project removals	Reassessed when baseline is reassessed. ΔCBSL-SHRUB,i,t, and ΔCWPS-

		ΔCWPS-SHRUB,i,t: Excluded from the project scenario as per section 5 (13) of CDM AR tool-14	crown cover detected within each transect was scaled on a per-hectare basis as per the equation 26 and 27 in CDM ARTool-14 (see section **Error! Reference source not found.**).		SHRUB,i,t is de-minimis and not accounted for in baseline or project scenario.
Carbon stock in herbaceous vegetation in the baseline and project scenario in stratum i in year t	Default value provided in VM0033	3 t C ha-1 was applied for strata with 100% herbaceous cover	For areas with a vegetation cover <100%, a 1:1 relationship between vegetation cover and CBSL-herb,i,t must be applied. The default factor was only applied for the first year of the crediting period as herbaceous biomass quickly reaches a steady state.	Calculation of baseline emissions Calculation of project removals	Reassessed when baseline is reassessed. ΔCBSL-herb,i,t and CWPS-herb,i,t is de-minimis and not accounted for in baseline or project scenario
CO2 emissions from the SOC pool of in-situ soils in the baseline and project scenario in stratum i in year t	Default value provided in VM0033	GHGBSL-insitu-CO2,i,t = -1.46 t C ha-1 yr-1 x 44/12	Default value is used unless transparent and verifiable information can be provided to justify a different value. Default value is applicable based on canopy cover (%) of tree and shrub cover in baseline and project scenario (see **Error! Reference source not found.**)	Calculation of baseline emissions Calculation of project emissions	GHGBSL-insitu-CO2,i,t and GHGWPS-insitu-CO2,i,t is de-minimis and excluded from the baseline and project scenarios ex-ante.
Deduction from CO2emissions from the SOC pool to account for the percentage of the carbon stock that is derived from allochthonous soil organic carbon	Needleman et al. (2018)2.	14.12% of GHGBSL-insitu-CO2,i,t and GHGWPS-insitu-CO2,i,t	Reference provided in VM0033 unless transparent and verifiable information can be provided to justify a different value.	Calculation of baseline emissions Calculation of project emissions	GHGBSL-insitu-CO2,i,t and GHGWPS-insitu-CO2,i,t is de-minimis and excluded from the baseline and project

[2] Needelman, B.A., I.M. Emmer, S.Emmett-Mattox, S.Crooks, J.P.Megonigal ,D.Myers, M.P.J.Oreska, and K.McGlathery. 2018. The science and policy of the verified carbon standard methodology for tidal wetland and seagrass restoration. Estuaries and Coasts41(8):2159-2171

					scenarios ex-ante.
Percentage of carbon of in-situ soil material in stratum i in year t	Bumtu et al. (2020)3	9.90%	Value selected from a peer-reviewed study on mangrove soil carbon in Cameroon, based on soil depth and canopy height comparable to the project area.	Calculation of baseline and project emissions	N/A
Proportion of an area covered by shrubs, and/or the crowns of live trees	Derived from application of CDM AR-Tool14 using data collected during the baseline forest inventory.	See sections **Error! Reference source not found.** & **Error! Reference source not found.** of Project Design Document	Baseline: ▪ Stratum 1: >50% crown cover applied from year 0–40. ▪ Stratum 2: Crown cover based on field data and conservative geospatial estimates. Project: ▪ Stratum 1 & 2: >50% canopy cover projected from year 15.	Calculation of baseline emissions Calculation of project removals	GHGBSL-insitu-CO2,i,t and GHGWPS-insitu are de minimis; thus, crown cover change linked to SOC is excluded from ex-ante estimates. Crown cover will be reassessed at first verification.- CO2,i,t
CO2 emissions from the eroded SOC pool in the baseline scenario in stratum i in year t	Sea Level Rise Study	0	Based on results of Sea Level Rise Study. No project areas are located within proximity to fluvial channels or riverbanks and are thus insulated from erosional forces.	Calculation of baseline emissions	N/A
Allowable uncertainty; 20% or 30% at a 90% or 95% confidence level, respectively	As per section 8.5.2 in methodology VM0033	0% uncertainty has been applied to net GHG emissions reductions ex-ante.	Project uncertainty is below allowable thresholds, so no ex-ante deductions were applied. Total error will be calculated at each monitoring event per VM0033 guidelines.	Calculation of net GHG emissions reductions	N/A
Total biomass of the tree returned by the allometric	See section **Error! Reference**	See section **Error! Reference**	Mean annual DBH increments are based on permanent plot data	Calculation of project removals	N/A

[3] Bumtu, Kamah Pascal, Nkwatoh Athanasius Fuashi, and Longonje Simon Ngomba. "A Baseline Assessment of Soil Organic Carbon in the Mangroves of the Bakassi Peninsula South-West Cameroon." (2020).

equation for species j based on the appropriate measurements of tree in each subsequent year.	**source not found.** (Tables 18, 20, & 21) of PDD	**source not found.** (Tables 18, 20, & 21) of PDD	from the Douala Estuary. AGB and BGB are estimated using Komiyama et al. (2005), a widely accepted mangrove equation, due to the lack of region-specific alternatives for Rhizophora and Avicennia spp.		

2.2. Monitoring Parameters

2.2.1. Change in Carbon Stock in Trees

Changes in the carbon stock in tree biomass in the project scenario will be quantified using fixed area, permanent sample plots, established in the first monitoring period and subsequently re-measured at each verification event.

Table 3: Monitoring Parameter. Change in Carbon Stock in Trees.

Result (Goal)	Indicator	Source	Means of Verification	Frequency of Update	Format of Source	Hypothesis
Calculation of project removals	Change in carbon stock in trees	Derived from Application of AR-Tool14 using data collected in the project area	Monitoring equipment will include standard forest inventory sampling equipment and will be included in the monitoring report. This includes DBH tapes, Clinometers, a GPS, and a botanist or ecologist for species identification.	At each monitoring period	t CO_2e yr^{-1}	Increase in project removals

2.2.2. Change in Carbon Stock in Shrub Biomass

Changes in the carbon stock in shrub biomass in the project scenario is conservatively excluded as per section 5(13) of CDM AR Tool-14. However, it will be quantified through the % crown cover of shrub vegetation using fixed area, permanent sample plots, established in the first monitoring period and subsequently re-measured at each verification event to demonstrate that shrub biomass remains unaltered due to project activities.

Table 4: Monitoring Parameter. Change in Carbon Stock in Shrub Biomass.

Result (Goal)	Indicator	Source	Means of Verification	Frequency of Update	Format of Source	Hypothesis
Calculation of project removals	Change in carbon stock in	Derived from application	Monitoring equipment will include standard forest inventory sampling	At each monitoring period	t CO2e yr-1	Increase in project removals

	shrub biomass in the project scenario in stratum	of CDM AR-Tool14 using data collected in the project area	equipment and will be included in the monitoring report. This includes measuring tapes, a GPS device, and a botanist or ecologist for species identification.			

2.2.3. Area of Project Stratum

Delineation of project boundaries are based on initial stratification of the project boundary totaling 1055.29 hectares. Individual polygons within each stratum will be verified and mapped by field-based cartographers after the completion of planting activities in any given planting year and subsequently uploaded to the project database map.

Table 5: Monitoring Parameter. Area of Project Stratum.

Result (Goal)	Indicator	Source	Means of Verification	Frequency of Update	Format of Source	Hypothesis
Calculation of project removals	Area of project stratum	GIS-desk based mapping combined with field-inventory data points recorded via GPS.	GPS (Garmin), GPS on smartphone, QGIS software	At each monitoring period	ha	Increase in project removals

2.2.4. Number of Plots in Stratum

Permanent sample plots will be established within each stratum during the first monitoring period in accordance with SOPs for forest inventory sampling.

Table 6: Monitoring Parameter. Number of Plots in Stratum.

Result (Goal)	Indicator	Source	Means of Verification	Frequency of Update	Format of Source	Hypothesis
Calculation of project removals	Number of plots in stratum	Derived from CDM A/R methodological tool 03 "Calculation of the number of sample plots for measurements within A/R CDM project activities,	GPS (Garmin), GPS on smartphone, QGIS software	At each monitoring period	Number	Increase in project removals

		equation (2)" Version2.1				

2.2.5. Area of a Sample Plot in Stratum

All areas planted will be tracked in the field using GPS, which is a standard procedure to be followed for both baseline and monitoring inventory.

Table 7: Monitoring Parameter. Area of a Sample Plot in Stratum.

Result (Goal)	Indicator	Source	Means of Verification	Frequency of Update	Format of Source	Hypothesis
Calculation of project removals	Area of a sample plot in stratum	Field measurement	GPS (Garmin), GPS on smartphone, QGIS software	At each monitoring period	ha	Increase in project removals

2.2.6. Proportion of an Area Covered by Herbaceous Vegetation, Shrubs, and/or the Crowns of Live Trees

Table 8: Monitoring Parameter. Proportion of an Area Covered by Herbaceous Vegetation Shrubs, and/or the Crowns of Live Trees.

Result (Goal)	Indicator	Source	Means of Verification	Frequency of Update	Format of Source	Hypothesis
Calculation of net soil GHG emissions reductions in the project scenario	Proportion of an area covered by the herbaceous vegetation, shrubs, and/or the crowns of live trees	Derived from application of CDM AR-Tool14 using data collected in the project area at each verification event.	Estimation of the % crown cover of trees and shrubs in each strata will be used to calculate GHGWPS-insitu-CO2,i,t as per default value provided in VM0033.	At each monitoring period	%	Please see publicly available project design document

2.2.7. Total Uncertainty for Project Activity

A precision target of 90% or 95% confidence interval equal to or less than 20% or 30%, respectively, will be targeted.

Table 9: Monitoring Parameter. Total Uncertainty for Project Activity.

Result (Goal)	Indicator	Source	Means of Verification	Frequency of Update	Format of Source	Hypothesis
Calculation of net GHG emissions reductions	Total Uncertainty for project activity	Calculated at each verification according *to* section 8.5.2 of methodology VM0033	Project-level uncertainty will be calculated in Microsoft excel and using R-statistical software	At each monitoring period	%	Total uncertainty will fall below 30% at 95% confidence interval or below 20% at 90% confidence interval

2.3. Sustainable Development Goals (SDGs)

The project supports multiple Sustainable Development Goals (SDGs) through a range of environmental and community-based activities, these are summarized below.

Key SDG contributions include:

- Quality Education (SDG 4)
- Decent Work and Economic Growth (SDG 8)
- Climate Action (SDG 13)
- Life Below Water (SDG 14)
- Life on Land (SDG 15)

The project's activities align with several SDG targets, supporting education, decent work, climate action, and ecosystem restoration. Progress toward these goals will be monitored using clear indicators such as the number of workshops delivered, jobs created, hectares restored, and carbon sequestered. These efforts also contribute directly to Cameroon's UN Sustainable Development Cooperation Framework priorities.

Table 10: Summary of SDG Contributions and Indicators.

SDG Target	Contribution	Monitoring Indicator
SDG 4.7	Environmental education and awareness	Number of schools reached, number of students participating in sensitization workshops, number of sensitization workshops and/or events
SDG 8.3	Support for income-generating activities (IGAs)	Number and type of activities established, amount of project funds allocated to support IGAs
SDG 8.5	Local employment creation	Number of full-time and daily workers employed
SDG 13	Climate action and carbon sequestration	tCO_2e sequestered by the project
SDG 14.2	Coastal and marine ecosystem restoration	Hectares of mangroves restored
SDG 15.1	Terrestrial ecosystem conservation	Number and size (ha) of community forests created

The table below offers a detailed overview of how the project's contributions to the Sustainable Development Goals (SDGs) will be monitored. It highlights the specific SDG targets addressed, and the indicators used to track and report progress during implementation.

Table 11: Sustainable Development Goals (SDGs) Monitoring Procedure.

Indicator	Source	Means of Verification	Monitoring Frequency	Unit	Hypothesis
Goal: SDG 4.7 By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development					
Number of schoolchildren reached through awareness and education activities on mangrove protection	Activity completion reports, Photographic documentation of awareness sessions; and signed participant / attendance lists	(i) Remote review of submitted evidence (ii) On-site verification missions including school visits and stakeholder interviews	At each monitoring period	Number of school children	Schools remain engaged and available for awareness activities; teachers and local education authorities support data collection; activities are not disrupted by external factors (e.g., weather events, school closures).
Number of schools sensitized to mangrove protection	Project activity reports, Photographic documentation, attendance sheets, and signed confirmation	(i) Remote: Review of submitted reports and documentation. (ii) On-site: Verification through school visits and interviews with	At each monitoring period	Number of schools	Participating schools maintain engagement throughout the project; education authorities approve the continuation of awareness activities; external disruptions (e.g., extreme weather or

	from school administrations	teachers and administrators.			administrative changes) do not prevent implementation.
Number of sensitization activities organized during national or international environmental events (e.g., International Day of Forests, International)	Event reports, photographic documentation, media articles	Event reports, photographic documentation, media articles, social media analytics	At each monitoring period	Number of events, Number of people reached	Events are organized as planned and receive sufficient institutional and community participation; communication channels remain accessible; security and weather conditions permit public gatherings.
Goal: SDG 8.3 Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services					
Number of income-generating activities (IGAs) established through project support	Project progress reports, beneficiary records, financial and business plans, field verification reports, and photographic documentation	Internal review of documentation provided by implementing partners; periodic field audits to assess the viability and social impact of supported activities	At each monitoring period	Number of initiatives established	Project support effectively enables beneficiaries to develop sustainable livelihood activities; sufficient technical guidance and follow-up are ensured;
Amount of project funds allocated to support income-generating activities (IGAs)	Financial reports, budget execution statements, partner NGO financial summaries, and audited expenditure reports	Remote: Review of financial reports and expenditure records. On-site: Verification of financial allocations and expenditures during monitoring and audit missions.	At each monitoring period	€ amount	Funds are disbursed according to the project budget and schedule; financial management systems remain effective and transparent; no delays or reallocation of funds affect planned IGA financing.
Goal: SDG 8.5 By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value					
Permanent employees working in partner NGOs contributing to project implementation	HR records, partnership agreements, and payroll summaries	Internal review of staffing reports provided by partner NGOs; verification during partner audits or monitoring missions	At each monitoring period	Number of employees	Partner NGOs maintain operational capacity and stable employment conditions; funding flows support sustained staffing; no significant staff turnover or restructuring disrupts implementation.

Daily workers employed to support field activities under the project	Payroll documentation, attendance records	Internal verification of data provided by partners; random field checks and interviews with selected workers to ensure accuracy and compliance	At each monitoring period	Number of daily workers	Project implementation requires short-term labor inputs; fair recruitment and payment procedures are maintained; local workforce availability remains stable throughout the implementation period.
Goal: SDG 13.0 Climate action and GHG sequestration					
Total GHG sequestered by the project	Project reports, calculations	Remote: Review of technical reports, carbon calculations, and models. On-site: Field sampling	At each monitoring period	tCO2 equivalent	Carbon sequestration estimates follow VM 033 methodologies; mangroves survive and grow according to planned restoration; no significant losses due to natural disasters, pests, or human disturbance; monitoring and measurement methods are accurate and consistent.
Goal: SDG 14.2 By 2020, sustainably manage and protect marine and coastal ecosystems, including by building their resilience, to avoid the severe consequences of their degradation and take action to restore them to healthy and productive oceans.					
Mangrove area restored under project activities	GPS/geo-tagged site data	Remote: Review of GPS data On-site: through site visits and GPS measurements	At each monitoring period	Hectares (ha)	Restoration activities are implemented according to plan; environmental and hydrological conditions support mangrove growth; local partners and communities maintain stewardship; restored areas remain stable over time.
SDG 15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and freshwater ecosystems and related services, in particular forests, wetlands, mountains and drylands, consistent with obligations under international agreements.					
Number of community forests formally established through project support	Legal documents, management plans, partner reports, field verification notes	Remote: Review of submitted documentation, management plans, and official approvals. On-site: interviews with stakeholders	At each monitoring period	Number of community forests	Communities participate in forest establishment; land tenure and governance arrangements are clear; project guidance and technical support are sufficient for establishment.
Total area of community forests established through the project	GPS/field maps, satellite imagery, activity reports, site verification	Remote: Review of submitted documentation, management plants, maps of community forests	At each monitoring period	Hectares (ha)	Communities participate in forest establishment; land tenure and governance arrangements are clear; project guidance and

					technical support are sufficient for establishment.

2.4. Preliminary monitoring results

As part of the project's regular site monitoring, all three partner organizations observed in the early stages that young mangrove propagules were being damaged by antelopes, which were attracted to their tender leaves. After consultations, several deterrent methods were trialled:

- Use of animal urine to deter antelopes. ultimately ineffective, as the scent dissipated quickly with the tide.
- Extended nursery periods to allow propagules to develop tougher, less palatable leaves before planting.
- Installation of protective wire fencing around nurseries to prevent antelope intrusion.

A separate issue, observed in early 2025 and currently limited to WTG's project sites in Dibombari, involves crab attacks on young mangroves. The crabs feed on both the roots and bark, weakening the propagules and, in some cases, causing them to dry out and die. The project team is currently assessing appropriate mitigation measures as part of its adaptive management process.