ASES ON-CHAIN PROTOCOL

STANDARD FOR DEVELOPMENT OF METHODOLOGIES

II. Standards V2.0

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ACRONYMS

VNPC	Verified Nature Positive Credit
VCC	Verified Carbon Credit
VBC	Verified Biodiversity-Based Credit
VWC	Verified Water Credit
VCAC	Verified Climate Action Credit
CDM	Clean Development Mechanism
aOCP	ASES Nature-positive Climate Action On-chain Protocol
GHG	Greenhouse Gases
GHG-SS	GHG Sectoral Scopes
GORD	Gulf Organisation for Research and Development
GWPs	Global Warming Potentials
IPCC	The Intergovernmental Panel on Climate Change
UNFCCC	United Nations Framework Convention on Climate Change

INTRODUCTION

The ASES On-Chain Protocol was developed based on international best practices, which included: ensuring transparency through stakeholder participation; creating an institutional structure to develop standards (for example, baseline and monitoring methodologies); creating robust project cycles that include clear and streamlined project registration and issuance procedures for Nature positive credits, an international blockchain-based carbon registry, and effective approval of project validity.

This document was created in accordance with the specifications laid out in the Program Manual, which serves as a link between different aOCP papers and contains the regulations regulating the aOCP Program. The Standard for the Development of Methodologies lays out the guidelines and specifications for creating a new methodology under the aOCP Program, as well as the sections and essential elements methodologies must have.

When using this document, the Project Proponent, aOCP Validators and Verifiers, the aOCP Operations Team, and the aOCP Steering Committee shall be subject to the requirements outlined in the Program Manual and Program Process.

I. PURPOSE

The objective of this document is to provide a comprehensive explanation of the rationale behind each section and element of the benchmarking and monitoring procedures, as well as the aOCP standards relating to the development of new methodologies.

II. aOCP METHODOLOGY DEVELOPMENT

This document specifies the requirements for developing each section of the methodology and describes the elements that must be present when developing a new methodology. These elements include the project boundary, the baseline scenario, additionality, calculation of project benefits such as emission reductions and removals (including baseline emissions, project emissions, and leakage), or other (biodiversity, soil health and erosion, water recharge) and monitoring.

The mandatory sections and components of the aOCP baseline and monitoring approach are described below.

II.1. aOCP SCOPE AND GHG SECTORAL SCOPE

The aOCP Framework and Program Manual describe the aOCP Scopes and GHG Sectoral scopes (GHG-SS) covered by the aOCP Program.

The applicable GHG-SS must be defined according to the guidelines in section IV of the aOCP Framework and those listed below.

GHG Sectoral Scopes	GHG Sectoral Scope Title
13	Waste handling and disposal – for the aOCP, only agroforestry waste for biochar production
14	Afforestation and Reforestation
15	Agriculture

For biodiversity methodologies, the baseline study's scope refers to the values of the biodiversity that will be examined. Additionally, the scope may specify the techniques and parameters to be employed, as well as the study's spatial and temporal scale.

II.2. Applicability conditions

When designing a Project activity, Projects' future benefits shall be assessed using methodologies approved by the aOCP. These methodologies set out applicability conditions that define the eligibility criteria a project must satisfy to be eligible for utilizing the methodology. These criteria encompass various factors such as technical, technological, policy, economic, and regulatory considerations that may influence the project activity's eligibility to employ the methodology.

In order to assess if a Project Activity is eligible to use the approach, the applicability conditions must be expressed clearly and without any ambiguity.

II.3. Project boundary

According to the adopted methodology, the project boundary of aOCP project activity is defined as the physical delineation and/or geographic area of the project activity as well as the specification of the aOCP Scope. Depending on the aOCP Scope, there are additional specifications that establish Project's boundaries. For instance, if it is GHGs, sinks and sources under the project proponent's control that are significant and reasonably attributable to the project activity shall be defined as the boundary. For biodiversity, the taxonomic groups to which biodiversity techniques apply should be specified. In the case of soil health and erosion methodologies, these are the scopes and the PSF shall state which is it considering.

The methodology shall:

- With a figure or flowchart, describe the physical boundary of the eligible project activity;
- For GHG, clearly state which sources and GHGs are contained within the project boundary, and if any sources associated with baseline emissions or project emissions have been left out, explain why and provide justification;
- Project Proponents must use conservative assumptions when defining the emission sources that are present within the project boundary in the baseline and project scenarios. For instance, the magnitude of emission sources left out of the project emissions calculation must be equal to or lower than the magnitude of equivalent emission sources left out of the baseline emissions calculations.

II.4. Baseline scenario

The baseline scenario accurately depicts the GHG emissions and removals, biodiversity conditions, and soil or water dynamics conditions in the absence of the aOCP Project Activity. It can be assessed by considering the normal evolution of the Project area if the project was not implemented, as well as by comparing it with other parcels within the microbasin, where no project or land use changes are implemented.

Documentation and reporting of the methodologies, data sources, calculations, uncertainties, and assumptions involved in the assessment is critical. Accuracy and reliability of the calculations can be ensured by using standardized protocols and scientific best practices.

II.4.1. GHG methodologies

The baseline of aOCP Project Activity shall be set by clearly defining the geographical boundaries of the project area and identifying the activities and land uses that will be included in the baseline assessment and considering both the direct and indirect GHG emissions associated with the project activities. The most likely scenario that would occur in the absence of the NBS project represents the business-as-usual or "do-nothing" scenario and serves as the baseline against which the project's emissions reductions or removals will be calculated. GHG emission sources and sinks within the project area shall be identified. This may include sources such as deforestation, land degradation, agricultural practices, or industrial activities. Sinks could include forest carbon sequestration, wetland restoration, or other natural processes that absorb or store carbon.

Relevant data on historical emissions, land use patterns, and activity levels within the project area can be obtained from various sources, such as national inventories, remote sensing data, field surveys, or scientific literature. A comprehensive understanding of the baseline scenario requires the assessment of the existing conditions and trends.

Appropriate methodologies and emission factors shall be used to calculate the GHG emissions and removals associated with the baseline scenario. It is important to consider factors such as carbon stocks, vegetation types, land-use changes, and relevant activity data.

II.4.2. Biodiversity methodologies

The baseline study is the process of gathering and analyzing data on a site's biodiversity values, including the species, habitats, and ecological systems that are there as well as their current conditions and trends before the start of a project. The methodologies used should show how natural groups and habitats might evolve in the absence of the project.

The designation of the research region is the first stage in creating the biodiversity baseline. The geographic area of anticipated project activities and impacts, or the project area of influence, should be included in the baseline research area. Expanding the study area based on the distribution of biodiversity and ecosystem assets across the landscape is a good practice.

Desk-based assessment should be used as the major source of data in the baseline research for biodiversity methods. After that, the information gaps found in the desk-based analysis, stakeholder consultation, and other sources should be filled by the field evaluation of biodiversity values.

The involvement of experts and stakeholders in the baseline investigation and monitoring process is beneficial. By engaging stakeholders, the ecosystem services and biodiversity values and dynamics within the project's region can be comprehensively described. In addition to identifying biodiversity values that should be considered in the scope of the biodiversity baseline study, experts familiar with the study area can provide valuable assistance by excluding values that are unlikely to be present and reviewing the results of field-based assessments as they become available.

Long-term biodiversity monitoring is necessary to verify the Project's impacts on biodiversity and as a requirement for the award of Verified Biodiversity Based Credits when the baseline study is finished and the project is registered in aOCP. The baseline study and the long-term monitoring program should be integrated throughout the project's lifespan, with the monitoring program continuing to use the same techniques and some of the same survey sites while using data from the baseline report as the baseline against which to measure project impacts.

II.4.3. Soil and Water restoration methodologies

The baseline scenario represents the expected outcome if the Project activities were not implemented. This baseline scenario should consider factors such as existing land use practices, regulatory requirements, and environmental conditions. It serves as a reference against which the project's impact can be measured. The polygons comprised within the project boundary will be assessed at the following periods:

- Before deforestation (if it occurred and if satellite images are available for this period)
- Before project implementation.

A counterfactual analysis is conducted to assess what would have happened in the absence of the project. Baseline will be surveyed synchronically via the remote monitoring approach along the life of the project. This will be done in areas within the microbasin with similar conditions at the beginning of the project and which do not undergo anthropogenic land use/land cover change. This will allow the comparison of the natural evolution of the ecosystem soil health and/or erosion, or water balance in the absence of restoration activities.

Methodologies might involve stakeholder and other sources of consultation as well as a desk review as the initial source of data for the baseline research.

II.5. Project additionality

According to the aOCP Project Standard, projects shall demonstrate that the GHG emissions and/or removals, biodiversity, soil health and/or erosion, and/or groundwater recharge are better to what would have happened in the absence of the project activity. To ensure 'additionality', the solutions must deliver carbon benefits compared to the business-as-usual situation, without the intervention.

By focusing on the unique ecological benefits that a project brings, it recognizes the importance of protecting and restoring ecosystems beyond their carbon sequestration potential. This broader perspective aligns with the objective of sustainable development, as it addresses the interconnectedness between human well-being and the health of ecosystems.

Each methodology, depending on its scope, shall establish the mechanism to assess additionality.

Ultimately, the Carbon Offset Research and Education program recommend to *"think of additionality in terms of risk: how likely is a project to be additional?"* rather than simply considering a Project as additional or not additional.

The aOCP recognizes and supports the use of the following barrier analyses and guidelines to substantiate project additionality. These recognized tools are an important support for claims of additional environmental benefits of projects. In particular, the aOCP places particular emphasis on ecological additionality, consistent with its overarching mission to promote climate action and ecological restoration.

1. Ecological Barriers: Evaluate the impact of degraded soil, catastrophic events, unfavorable meteorological conditions, and grazing pressures, which present significant obstacles to achieving lower emissions and emphasize the project's ecological significance.
2. Financial Analysis: Conduct an in-depth evaluation to determine if the project relies on carbon funding to sustain its operations. This analysis can include an investment assessment to ascertain that the project is not the most financially attractive option.
3. Technological Barriers: Identify any limitations in accessing essential resources such as planting materials, equipment, or infrastructure necessary for implementing a technology. Demonstrating that the business-as-usual scenario would result in higher emissions underscores the importance of the project.
4. Alternatives to the Project Scenario: Provide evidence that the project mitigates a genuine threat, particularly in terms of land use, preventing the conversion of the land to alternative harmful uses.
5. Institutional Barriers: Examine any institutional challenges, such as inadequate enforcement of land use regulations or changes in government policies or laws, that hinder the project's implementation.
6. Local Tradition: Consider traditional knowledge, laws, customs, market conditions, and practices that impede the adoption of a more carbon-efficient scenario.
7. Social Barriers: Assess factors like population growth, social conflicts, widespread illegal activities, land tenure issues, property rights, and the absence of defined property rights that create additional challenges for the project.

II.6. Projects' impacts quantification

The aOCP deploys a system of methodologies categorized by aOCP-Scope, covering GHG, biodiversity, soil and water. Methodologies can be further subcategorized; for instance, GHG can be quantified in vegetation, soil or from biochar, each having its own methodology. Since aOCP Project activities can produce positive results in many of these Scopes, it is necessary to assess their impacts using appropriate methodologies as needed.

The aOCP harnesses the capabilities of digital technologies and remote sensing to enable frequent, cost-effective, semi-automated, and replicable evaluations of ecological conditions and functions within the Project area. Methodologies designed for use under the aOCP should encompass both in situ assessment techniques and remote sensing methods, ensuring a robust comparison of their respective outcomes to validate their accuracy. In all cases details on aspects such as data collection, aggregation, analysis, reporting and other significant monitoring requirements shall be provided.

The methods and techniques utilized should be founded on robust scientific knowledge documented in peer-reviewed papers. Simultaneously, they should be presented in a manner that is comprehensible and reproducible. The methodologies shall also incorporate detailed instructions on the calculation process to determine the number of credits (for the respective VNPC type) to be issued, as a function of the quantified benefits generated by the Project. This approach ensures transparency by enabling public stakeholders to scrutinize and comprehend the calculations involved in VNPCs issuance.

It is essential to establish quality control measures, such as:

- Standardized Sampling Techniques: Specify standardized procedures for sampling, including sample size, distribution, and number of replicates, to ensure consistency and accuracy in data collection.
- Laboratory Analysis Standards: Define specific laboratory analysis methods and protocols. This ensures consistent and reliable results across different testing facilities.
- Data Validation and Quality Control Checks: Establish criteria for data validation and quality control checks to identify and address any errors or inconsistencies in the collected data. This may include checks for outliers, missing values, or data entry errors.
- Field Observation Protocols: Standardize the methods for recording field observations to ensure consistency and comparability.
- Remote Sensing Protocols: Standardize the methods and data sources for making remote observations, promoting high spatial and temporal resolution. This will help to ensure accuracy, consistency and comparability.
- Quality Control Audits: Conduct periodic quality control audits to assess the overall effectiveness and reliability of the methodology. This can involve independent verification of data and analysis procedures to ensure compliance with the established standards.
- Documentation and Reporting: Clearly document all procedures, protocols, and data collection methods in the methodology. This includes documenting any deviations from standard procedures and providing detailed information on how the data was collected,

analyzed, and interpreted. It is important to have a transparent and comprehensive report that can be reviewed and replicated by others.

II.6.1. Greenhouse gases

For GHG, methodologies must specify how baseline and projected emissions, leakage and emission reductions/removals from GHG pools and sources, relevant to the proposed Project activities, will be calculated and provide techniques for calculating project emissions and leakage.

II.6.2. Biodiversity

Biodiversity methodologies should establish guidelines for the identification and selection of ecological communities to be assessed, as well as the use of appropriate indices to evaluate the ecological condition of the Project area and its surrounding area of influence.

II.6.3. Soil health and erosion

Soil assessment methodologies can focus on soil health, soil erosion, or both. The elements to assess shall allow the evaluation of sustainable soil management practices implemented on the Project area. Project benefits can be quantified in terms of improvements to soil conditions or reduction of soil degradation, both in relation to the baseline scenario.

II.6.3. Water

Methodologies for water assessment may focus on water quality improvement, water retention and recharge, water availability and supply, habitat conservation, flood mitigation, etc.

II.7. Baseline and Project Monitoring

The methodology must specify the parameters to be monitored (such as those used to determine baseline emissions, project and leakage emissions, as well as emission reductions for proposed projects). The methodology must specify whether the parameter value for each parameter will be fixed ex ante (before registration) or routinely monitored. For parameters to be monitored, it shall establish guidelines for the frequency, manner, accuracy, and other requirements for measurement.

If default values for parameters are allowed, it shall define which ones and under which circumstances, provide references and guidelines, and justify the representativeness and conservatism of values chosen.

The methodology shall provide guidelines for the elaboration of the monitoring plan, including sample design, and monitoring frequency and procedures, detailing recommendations for on-site and remote sensing monitoring.

After the baseline study is finished and the project has been registered in aOCP, regular monitoring must be conducted using the same approach to confirm the project's benefits by contrasting the initial state with the status at the monitoring period. Verified Nature Positive Credits are issued as soon as the monitoring-reporting-verification (MRV) process confirms positive outcomes.

II.9. Global Warming Potentials

To determine the GHG emission reductions or removals attained by an aOCP Project Activity, the methodology shall apply the global warming potentials (GWPs), as specified in the aOCP Project Standard.

III. General Rules for Projects When Applying aOCP Methodologies

Unless otherwise stated in a GHG methodology or tool that applies, IPCC default values must only be used when data that are documented to be project- or country-specific are either:

a) Not available;
b) Not trustworthy or of insufficient quality according to the project proponent's or the aOCP validator's/evidence-based verifier's assessment.

The same data sources (e.g., IPCC values, national values) and calculation and/or measurement procedures for each parameter (e.g., calculation of annual average flow rate, hourly measurements) shall be applied for both baseline- and project-monitoring calculations when using methodologies or tools that demand determination of parameter(s) for calculating baseline scenarios and project impacts but do not specify procedures for determining those parameters. If, for instance, a calculated emission factor based on measured data is used to calculate emissions in the baseline, the same calculated emission factor must be used to calculate emissions in the project, unless otherwise specified in the methodology or tool being utilized. The conservativeness of emission reductions shall be the basis for the selection of data sources if it is not practicable to use the same data sources.

It is necessary to record the observed or default parameter values that are used to calculate baseline emissions, project emissions, leakage, , and the condition of biodiversity, soil and water. The most conservative value among the suitable values should be utilized if more than one is determined to be appropriate.

The Project Proponent shall publicly state and describe the sources of all values used (e.g., peer reviewed literature, test findings, government reports/statistics) to show that appropriate and conservative values have been employed.

Instead of quoting secondary publications that make reference to original sources, original sources must be cited using a standard referencing style.

When combining data from multiple sources to derive a value, the sources must be clearly identified.

The Project Proponent must provide evidence for the suitability, applicability, and conservatism of the values chosen and their sources.

DOCUMENT HISTORY		
Version	**Date**	**Comments**
V2.0	07/07/2023	• Edited version. Guidelines for soil and water methodologies were added, as well as deeper considerations on additionality.
V1.0	19/01/2023	• Initial version released for review by the aOCP Steering Committee under the aOCP Version 1.