PROJECT: 101114119

LIFE22-CCM-IT-LIFE OLIVER

OLive tree for VERified Reduction generation

Deliverable factsheet	
Deliverable number:	D2.1
Deliverable title:	OLIVER Protocol
Lead Partner:	TETIS INSTITUTE S.r.l.
WP no. and title:	WP 2 – Development of protocol for olive sector access to the voluntary carbon credit market
Task no. and title:	T.2.3 - Designing and presentation of a protocol for olive sector access to the voluntary carbon market (VCM)
Description:	The verified carbon Protocol OliVER for the olive groves sector
Version:	1.00
Version Date:	20 December 2024

Dissemination level	
X	PU = Public
	PP = Restricted to other programme participants (including the EC)
	RE = Restricted to a group specified by the consortium (including the EC)
	CO = Confidential, only for members of the consortium (including the EC)

SUMMARY

VERBAL FORMS FOR THE EXPRESSION OF PROVISIONS

The following verbal forms are employed to convey provisions within the Protocol, including all the relative Annexes.

- **"shall":** indicates requirements strictly to be followed in order to conform to the Protocol.
- **"should":** indicates that among several possibilities one is recommended as particularly suitable, without excluding others, or that a certain course of action is recommended but not necessarily required.

1. PROTOCOL TITLE, GOAL AND SCOPE

The verified carbon Protocol OliVER for the olive groves sector (hereinafter referred to as "the Protocol") has the objective to define the requirements for quantification and certification of net carbon removal and emission reductions from carbon farming practices in the olive tree cultivation.

Carbon farming is defined as a carbon removal activity related to land use or/and management that results in the increase of carbon storage in living biomass, dead organic matter and soils by enhancing carbon capture and/or reducing the release of carbon to the atmosphere.

OliVER protocol shares the goals to maintain and enhance the carbon stock stored, contributing to greenhouse gas (GHG) reduction in the olive tree sector and to define the rules for accessing to the carbon credit market.

This protocol defines:

- the activities that can potentially generate carbon credits
- the methodologies for quantifying carbon sequestration and/or emissions reduction,
- the requirements to make the calculation methodologies and the monitoring system during the crediting period credible, reliable and transparent,
- the requirements of the validation and verification procedure.

2. FIELD OF APPLICATION

This protocol is applicable to all the operator/groups of operators that want to generate certified carbon units from carbon farming practices on olive tree cultivation they have the ownership or the legal right to operate on. Specifically, the conditions of applicability of the protocol are as follows:

- The owner and/or concessionaire of the olive grove agrees to apply the practices for a duration of 10 years. Continuous internal monitoring and third party periodical verification are performed ensuring the implementation of the carbon farming practices, while verifying that olive tree surface occupied by recognized carbon removal land uses within the whole farmland are not subjected to a decrease;
- The owner and/or concessionaire of the olive grove does not join carbon farming projects competing with the one present on the same olive grove plot;
- The owner and/or concessionaire of the olive grove is committed to the application of the practices identified in the submitted project.

The protocol establishes a methodology for assessing the tons of CO_2 associated with olive tree cultivation. The calculation and quantification of credits derives from the balance between project emissions and carbon sequestration, considering only the related additional contributions.

The carbon farming activities proposed by this protocol shall comply with the Do No Significant Harm (DNSH) principle and shall not cause significant harm to, or may generate co-benefits for, any of the following sustainability objectives:

- climate change mitigation;
- climate change adaptation;
- sustainable use and protection of water and marine resources;
- transition to a circular economy;
- pollution prevention and control;
- protection and restoration of biodiversity and ecosystems.

2.1 APPLICABILITY CONDITIONS

This protocol is applicable to activities that introduce sustainable agriculture land management practices in the olive sector. It is applicable to all the scales i.e., microscale, small-scale and large-scale activities' project.

A project can be implemented by a single project proponent at one location or across multiple locations where they have operational rights. Additionally, grouped projects are permitted, allowing multiple actors—such as olive growers or other entities—organized through a group, association, agreement, or similar arrangement to combine efforts into a single project. This approach enables the centralization of knowledge and maximizes the opportunities of a Verified Emission Reduction (VER) project.

3. NORMATIVE AND METHODOLOGICAL REFERENCE FRAMEWORK

The normative and methodological framework upon which this Protocol (and the related Validation and Verification activities) is based consists of the following international standards:

ISO/IEC 17029:2019 "Conformity assessment — General principles and requirements for validation and verification bodies" which contains general principles and requirements for the competence, consistent operation and impartiality of bodies performing validation/verification as conformity assessment activities. This document is applicable to validation/verification bodies in any sector, providing confirmation that claims are either plausible with regards to the intended future use (validation) or truthfully stated (verification)

UNI EN ISO 14065:2022 "General principles and requirements for bodies validating and verifying environmental information" which specifies principles and requirements for bodies performing validation and verification of environmental information statements.

UNI EN ISO 14064-3:2019 "Greenhouse gases - Part 3: Specification with guidance for the verification and validation of greenhouse gas statements" which specifies principles and requirements and provides guidance for verifying and validating greenhouse gas (GHG) statements. It is applicable to organization, project and product GHG statements.

UNI EN ISO 14064-2:2019 "Greenhouse gases - Part 2: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements" which specifies principles and requirements and provides guidance at the project level for the quantification, monitoring and reporting of activities intended to cause greenhouse gas (GHG) emission reductions or removal enhancements. It includes requirements for planning a GHG project, identifying and selecting GHG sources, sinks and reservoirs (SSRs) relevant to the project and baseline scenario, monitoring, quantifying, documenting and reporting GHG project performance and managing data quality.

The Figure below synthetizes the relationship between the above-mentioned standards:

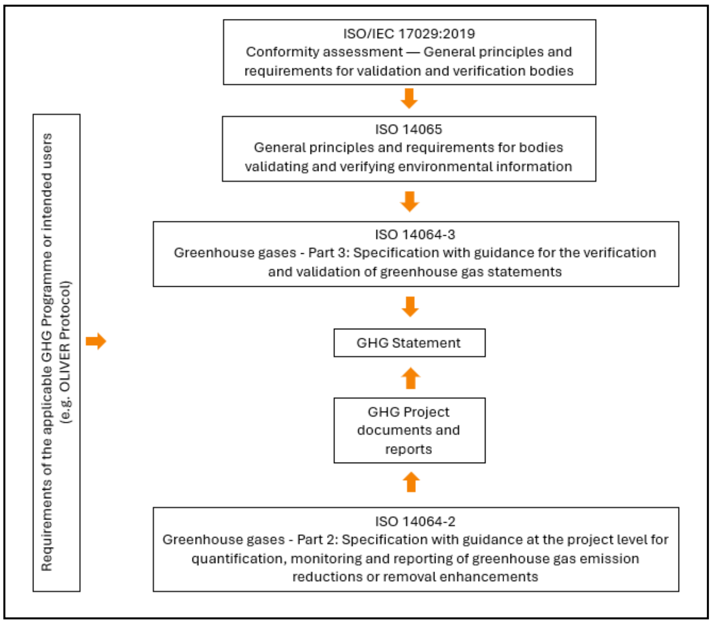

Figure 1 – Relevant normative framework for Protocol application

Besides the above, the Project and the implementation of project activities shall not lead to the violation of any applicable law in the country where it is realized.

4. DEFINITIONS

Additionality: A characteristic of a change that would not have occurred without the associated policy or activity. Since it cannot be proven with complete certainty, the focus is on estimating the "risk of non-additionality." While additionality is essential for claims like carbon offsetting, it may be relaxed or disregarded in cases without compensation claims, such as government incentives for regenerative practices.

BAU: "Business As Usual" scenario or baseline scenario. It is the carbon removal performance that would occur in similar environmental conditions in absence of carbon farming practices. (source: Carbon farming certification scheme standard C-FARMs).

Carbon credit: A carbon credit is a tradable instrument issued by a carbon crediting program, representing a reduction or removal of one metric tonne of CO2e compared to a baseline scenario. It is uniquely serialised, tracked, and retired or cancelled via an electronic registry managed by an administrative body. Carbon credits can be used for compliance with climate goals or regulated markets, as well as for voluntary purposes, such as offsetting emissions or supporting climate objectives.

Conservation Agriculture is a farming system that promotes minimum soil disturbance (i.e. no tillage), maintenance of a permanent soil cover, and diversification of plant species. It enhances biodiversity and natural biological processes above and below the ground surface, which contribute to increased water and nutrient use efficiency and to improved and sustained crop production.

Crediting period: The period in which verified and certified GHG emission reductions or net anthropogenic GHG removals by sinks attributable to a project activity can result in the issuance of VERs.

Double Counting: the benefit or value of one (Emission Reduction) ER unit being inadvertently (or intentionally) used twice or more, or when a carbon credit is claimed by more than one entity, even though no additional carbon benefit is produced.

GHG – Greenhouse Gases: any gas that has the property of absorbing infrared radiation (net heat energy) emitted from Earth's surface and reradiating it back to Earth's surface, thus contributing to the greenhouse effect.

Emission reduction: A net reduction in anthropogenic greenhouse gas emissions by sources.

Leakage: The displacement of greenhouse gas emissions to another location as a result of mitigation actions, reducing or negating their intended effects. For example, reforesting pastureland may lead to land clearing elsewhere to meet demand.

Monitoring: The continuous or periodic collection of data on GHG emissions, removals, or other GHG-related metrics to measure decreases in emissions or increases in sequestration (ISO 14064-3:2019). As part of Monitoring, Reporting, and Verification (MRV), monitoring involves data collection, reporting encompasses communication of results, and verification ensures the accuracy and reliability of the data and outcomes through independent validation.

Project Proponent: it is the organisation requesting the registration of an emission reduction or removal project and issuance of carbon credits under a carbon crediting programme. It is responsible for collecting project data, quantifying the volume of emission reductions or removals and for implementing the monitoring plan.

Project duration: the number of years beginning from the project start date, that project activities will be maintained. In this specific Protocol, it is assumed to be equal to the crediting period.

Regulatory surplus: means that project activities shall not be mandated by any law, statute, or other regulatory framework.

Removal: A net enhancement of anthropogenic greenhouse gas removals by sinks.

Retirement: The permanent removal of a carbon credit in a registry for the purpose of claiming the associated emission reductions or removals towards compliance requirements or voluntary goals.

Reversal: A situation where the net GHG benefit, taking into account project or program emissions, removals and leakage, in any monitoring period is negative. The amount of a reversal is calculated as the difference between the current total to-date net GHG benefit of the project or program, compared to the total to-date net GHG benefit of the project or program at the previous verification event. In particular two types of reversals could be defined: avoidable and unavoidable reversals.

- **Avoidable Reversal:** A reversal over which the project proponent has influence or control. Examples include poor project management, removal of a portion of the project area from participation, harvesting/over-harvesting, or tillage events.
- **Unavoidable Reversal:** A reversal over which the project proponent has no control. Examples include natural disasters such as hurricanes, earthquakes, flooding, drought, fires, tornados and winter storms, and human-induced events such as acts of terrorism, crime, or war. Encroachment by outside actors (e.g., logging, mining, or fuelwood collection) are considered unavoidable when demonstrably unforeseeable and out of the project proponent's control.

SOC – Soil Organic Carbon: represents the amount of carbon retained in the soil after the decomposition of the organic content. It is a vital indicator in soil health assessment because it directly determines soil quality and food production.

Stakeholder: any individual or group whose interests are affected by the project activity.

Stakeholder consultation: is a broad term that covers processes involving Stakeholder identification, Stakeholder engagement planning, disclosure of information, consultation and participation, monitoring, evaluation of feedback and, addressing grievances, throughout the project life (Gold Standard, 2022).

Start Date: the date on which the project began generating GHG emission reductions or removals.

Validation: process for evaluating the reasonableness of the assumptions, limitations and methods that support a statement about the outcome of future activities (ISO 14064-3:2019).

Verification: process for evaluating a statement of historical data and information to determine if the statement is materially correct and conforms to criteria (ISO 14064-3:2019).

Validation & Verification Body (VVB): An independent, accredited organization responsible for assessing and ensuring the credibility and accuracy of greenhouse gas (GHG) projects. During **validation**, the VVB evaluates whether a project's design meets the required standards and criteria. During **verification**, it confirms the accuracy of reported GHG reductions or removals by reviewing monitoring data and calculations. VVBs play a critical role in ensuring transparency, integrity, and compliance within carbon markets and certification schemes.

VER: Verified Emission Reduction that can be exchanged in the voluntary carbon market. Verified: checked and approved by a third party according to the rules set by the owner of the VER programme.

5. GENERAL PRINCIPLES OF GHG EMISSION REDUCTIONS AND REMOVALS

The GHG emission reductions or removal shall comply with the following general principles:

- **Real:** Carbon credits must represent real emission reductions or removals. Carbon credits are measured, monitored, and verified ex-post.
- **Measurable:** baseline and all GHG emission reductions and removals must be quantifiable using scientifically robust or peer-reviewed methods and/or measurement tools (including adjustments for uncertainty and leakage). A procedure based on monitoring, of calculations backed by data and of the support of a methodology has to be adopted.
- **Permanent:** Carbon credits are issued for permanent emission reductions or removals. In case GHG emission reductions or removals are generated by projects that carry a risk of reversibility, adequate safeguards must be in place to ensure that the risk of reversal is minimized and that, should any reversal (see par. 5.7.12) occur, a mechanism is in place that to ensure any carbon credits lost to intentional or unintentional reversals are replaced (e.g., buffer pool). The application of the Protocol should align with what is reported in the EU Provisional Agreement for CRCF Regulations the definition for Permanent Carbon removal is: " 'permanent carbon *removal*' means *any practice or process* that, under normal circumstances and using appropriate management practices, *captures and* stores atmospheric or biogenic carbon for several centuries, including *permanently chemically bound* carbon *in products, and which is not combined with Enhanced Hydrocarbon Recovery.* For a proper management of the permanence of the credits a buffer mechanism has been defined (see 5.7.12)**.**
- **Additional:** GHG emission reductions and removals must be additional to what would have happened under a business as-usual scenario if the project had not been carried out.
- **Independently verified:** all GHG emission reductions and removals must be verified to a reasonable level of assurance by a Validation/verification body with the expertise necessary in both the country and sector in which the project is taking place.
- **Unique:** each VER associated with a specific GHG emission reduction or removal activity must be unique. There must be no double counting of the GHG emission reductions or removals, or double issuing, or double registration on different registries.
- **Transparent:** there must be sufficient and appropriate public disclosure of GHG-related information to allow intended users to make decisions with reasonable confidence.
- **Conservative:** conservative assumptions, values and procedures must be used to ensure that the GHG emission reductions or removals are not over-estimated.
- **Completeness:** Include all relevant GHG emissions and removals. Include all relevant information to support criteria and procedures.
- **Accuracy:** Reduce bias and uncertainties as far as is practical.

6. PROJECT REQUIREMENTS UNDER THE PROTOCOL

This section outlines the general rules and requirements for projects seeking certification under the Protocol.

- **Compliance**: Projects must adhere to the Protocol's rules and requirements, following its guiding principles.
- Methodology Application: Projects must apply the latest version of approved calculation methodology (Annex 1), including associated requirements for Project Design Document (PDD) and project template (Annex 3).
- **Legal Integrity**: Project activities must comply with all applicable laws, including all relevant national and European laws in force within the territory where the project will be implemented.
- **Model Selection**: When choosing models for emission quantification, they must meet the Protocol's requirements and be validated for suitability.
- **Default Factors**: If using third-party default factors for GHG data, they must conform to the Protocol's requirements.
- **Updates**: New rules under the Protocol take effect from the date of the release of the last Protocol version.
- **Validation and Verification Process:** Projects must undergo validation and verification processes carried out by a third part accredited Validation and Verification Body (VVB).

Should the project meet all these requirements, it will be eligible to request registration on a public Registry and the issuance of credits, following the procedures outlined by the Protocol.

6.1 ELIGIBILITY CRITERIA

The Protocol applies to project activities aimed at increasing SOC storage and/or reducing net emissions of greenhouse gases (GHG) from sustainable agricultural land management operations compared to the baseline scenario. Projects that generate carbon credits from a product-based methodology or through lifecycle assessment approach are not eligible.

Only activities that fully comply with the applicable legislation in the area where the project is implemented are eligible to be included as project activities. This ensures that all actions undertaken adhere to legal requirements, safeguarding both environmental and regulatory standards. Only activities compliant with the regulatory framework can be measured, quantified, and shall be considered valid contributions.

The project activities eligible according to the Protocol are reported in the following Table 1. The list of agronomic practices given in the Table 1 may be supplemented in a new Protocol version by other practices identified by future developments in agronomic techniques, complying with the protocol requirements.

TYPE OF AGRONOMIC PRACTICE	ADDITIONALITY RATIONALE	UPGRADING PRACTICES
FERTILISATION AND SOIL IMPROVEMENT	The management of fertilisers and soil improvers must aim to: - reduce losses of nitrogen oxides and ammonia from the soil, caused by the degradation of nitrogenous fertilisers, both chemical and organic; - reduce carbon losses from the soil due to the degradation of organic matter; - increase soil carbon sequestration; where soil improvers or organic fertilisers are already used, an increase in the quantity distributed or a switch to other types with a higher organic matter content can be envisaged.	decrease in the amount of nitrogen distributed with chemical/organic fertilisers, considering the potential yield
		manure management: application after anaerobic digestion
		manure management: application after composting
		application of municipal waste: compost from municipal solid waste and sewage sludge
		agro-food by-products: application after anaerobic digestion
		agro-food by-products: application after composting
		application of agro-food by-products provided “as-is” (e.g. pomace)
		switching to other types of commercial organic fertilisers
		manuring
MANAGEMENT OF PRUNING RESIDUES	Where the pruning residues are burnt in the field or removed, their use, even partial, as a soil conditioner can be envisaged after shredding,	use of pruning residues as a soil conditioner after shredding
SOIL MANAGEMENT	Changes in soil management can increase carbon sequestration or reduce carbon losses.	Permanent/temporary artificial grassing and soil mechanical management
		Permanent/temporary natural grassing and soil mechanical management
		green cover with leguminous species and soil mechanical management
		green cover with leguminous with green manure
		green cover with leguminous and grasses with green manure

		milling/harrowing only on the row
		hydraulic soil management to prevent erosion
		use of grazing animals provides weed control and fertilisation
OLIVE TREE GROWING PRACTICES	Certain agronomic practices (change of fertilisers, increase in soil water availability, etc.) can increase the growth of the permanent parts of the olive tree causing them to grow larger than normal.	Performing practices to increase the growth of permanent parts of the tree

Table 1 – Eligible carbon farming practices under the Protocol

6.2 ADDITIONALITY CRITERIA

The Protocol requires to demonstrate the additionality of project activities compared to a baseline scenario, through the following steps:

Step 1: Regulatory Surplus

The project proponent must demonstrate a regulatory surplus compared to what is required by binding laws or regulations in the area where the project is developed, during all the crediting period, thus ensuring that the project is voluntary.

Step 2: Demonstrate that the adoption of the proposed activities is not common practice.

The project proponent must determine if the proposed activity is common practice in each area included within the project's geographical boundaries. Common practice definition is based on the prevalence of implementation in the geographic area. An activity with a high existing implementation rate can be considered additional only through the assessment of the average rate for all project lands. The average implementation rate can be demonstrated by referring to:

a) Agricultural censuses;
b) Scientific literature;
c) Independent research data and benchmarks;
d) Reports or assessments compiled by industry associations.
e) Reports or assessments compiled by industry associations.

The Adoption Rate (AR) of a certain practice (if AR >20% the activity is considered to be common practice) could be determined by applying the following formula.

$$AR=((EAa1 \times PAa1)+(EAa2 \times PAa2)+\cdots+(EAay \times PAay)$$

Where:
AR = Weighted average adoption rate in the region.

EA ay = Existing adoption rate of proposed project activity ay in the region.
PA ay = Ratio of proposed project level adoption of activity ay relative to proposed project-level adoption of all activities in the region.
Area ay = Area of proposed project level adoption of activity ay in the region hectares.
ay = 1,…, ay proposed project activities ranked by area covered in the region where 1 = largest area covered.

A flowchart is below reported for determining when the weighted average should be recalculated taking into account new activity instances for common practice demonstration.

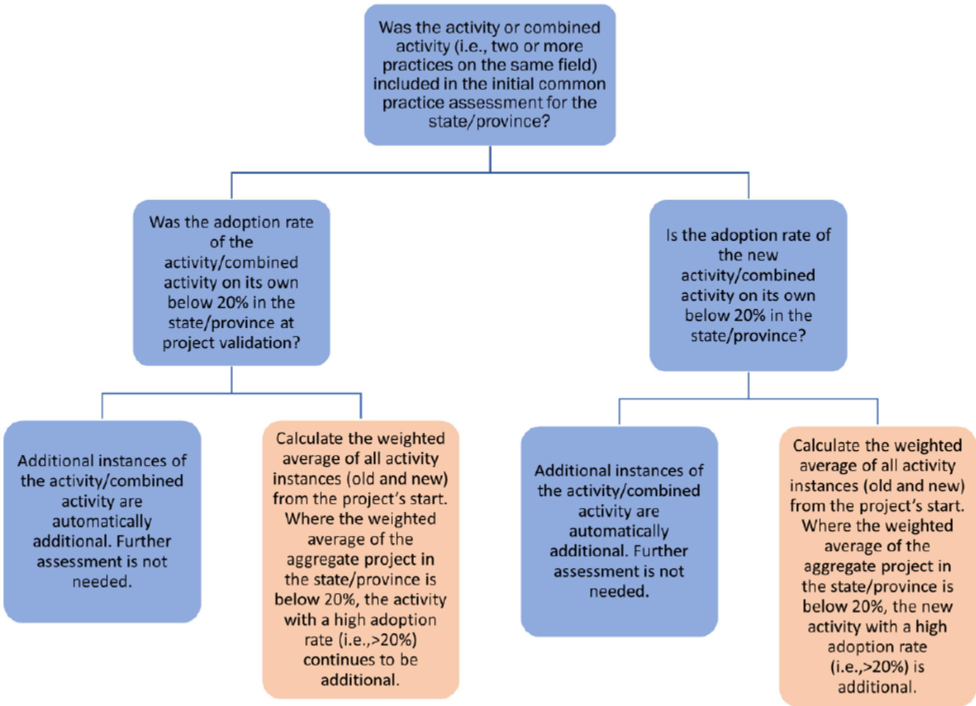

Figure 2 – Scheme for common practice demonstration

Step 3: Identify barriers that would prevent the implementation of a change in existing agricultural land management practices.

The project proponent must identify one or more barriers to the implementation of the project activities, such as financial, temporal, cultural, social and institutional barriers, that would prevent the implementation of the project activity itself without the proponent's intervention. For instance, market penetration analysis**,** Investment, cost, or other financial analysis**,** Performance standards / benchmarks are instruments that can be used for such purpose**.**

The project proponent must list and describe all the barriers to the implementation of the proposed project activities and demonstrate, by referring to specific proved evidences, that the change would not occur without the project proponent's undertaking. The barriers that must be overcome may include established knowledge, customs, market conditions and lack of incentives to change practices, such as but not limited to:

- Openness of the farmers to new ideas and perception of the extent of change;
- Traditional equipment and technologies;
- Farmers' risk tolerance regarding the adoption of new practices.

When steps 1-3 are satisfied, the project is considered to be additional.

6.3 DOUBLE COUNTING

The project proponent shall demonstrate with documented evidences that no Double Counting can occur. In particular, project proponent shall demonstrate that:

a) The GHG emissions reductions/removals are not accounted within any relevant system (voluntary or mandatory) of the host country/regional regulator;
b) Participation in the regulatory scheme is voluntary;
c) The GHG emissions reductions/removals scope are not accounted within other certification or accountability Programme/Mechanisms.

In order to mitigate the risk of double counting, the Protocol requires that the VER units shall be issued in a transparent and publicly available registry that allows for clear serial numbering and unequivocal attestation as to purpose. Also, the public Registry shall release an attestation of any permanent retirement of the issued units with all specifications (beneficiary, project, serial number, date of retirement, number of units retired) clearly listed. This attestation is required to demonstrate that the purpose of cancellation was voluntary and explicitly for the mitigation of double counting risks.

7. BASELINE SCENARIO DEFINITION

All activities before project implementation shall comply with all applicable laws, including all relevant national and European laws in force within the territory where the project will be implemented.
Any change in greenhouse gas emissions or removals due to the project activities shall be measured against a baseline. The baseline is defined at project level and considers all activities implemented by the olive growers at the moment in which they will take part to the project.
The Protocol complies with the "REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL establishing a Union certification framework for permanent carbon removals, carbon farming and carbon storage in products" (EU, 2024) that requires that the baseline "*should be representative of the standard performance of comparable practices and processes in similar social, economic, environmental and technological circumstances and take into account the geographical context, including local pedo-climatic and regulatory conditions*".
The temporal factor shall be considered in the baseline definition because an additional activity may become common practice in the area over time. An activity shall be considered as a common practice if the adoption percentage in the relevant area is greater than 20%.

The baseline (BS) is defined by the following formula:

$$BS = \sum_{i=1}^{n} (DA_i * EF_i) + SOC_{BAS0}$$

where:
DA_i= represents the activity data in absence of a project. The activity data to be taken into consideration are reported in Table 2, each with the respective unit of measure;
EF_i= represents the Emission Factor of the single activity data. These factors are reported in Table 2 with the respective units of measure and the related explanation for their calculation;
SOC_{BAS0}= is the soil organic carbon stock within the project spatial boundary at 0-30 cm depth transformed into CO_2 (1 Mg of SOC increase is equivalent to 3.66 Mg of SOC-CO_2). The methodology for calculating SOC is reported in the dedicated Protocol annex (**Annex 1**).

Parameters can be modelled or derived from direct measures. Parameters that should be directly measured are: soil texture, bulk density and dimension of particles fraction.

The baseline shall be modelled annually from year 0 to the end of the crediting period. The baseline shall be compared with SOC stock measurements taken during the monitoring period. The net reduction of GHG emissions will be assessed by comparing the cumulative contributions of the practices between baseline scenario and project scenario.
Concerning other emissions and parameters due to the Agricultural Land Management practices, an approach based on the use of Default emission factors (i.e. from the latest available versions of the Italian Greenhouse Gas National inventory Report (NIR), or from commercial Database Ecoinvent, or from literature) could be used. In this case, an estimate of the potential effect of the practices in the baseline scenario is provided in Table 2 below. Each practice is generally defined, and the associated emission factor is reported, along with the definition of the GHG impact calculation, which requires specific parameters.

Tab 1 provides the most recent values available at the time of the release of **Version 1.0** of the Protocol. Project baselines must be developed by considering the latest publicly available version of the bibliographic documents listed in the references.

BASELINE PRACTICE	DESCRIPTION	EMISSION FACTORS	VALUE DEFINITION	REFERENCES
CHEMICAL NITROGEN FERTILIZATION	Fertilization, especially nitrogen, is a cultivation technique that greatly affects the olive tree productivity. Nitrogen is normally supplied with urea, which has a low cost per fertiliser unit, a very high nitrogen content (46%), a neutral reaction, and a fast and relatively long-lasting effect. Other nitrogenous fertilisers used in olive growing are nitric fertilisers, which have a very fast effect and are therefore preferable when nitrogen must be immediately available to the plants, e.g. in spring, particularly in colder areas where nitrification processes are slow, but are also very susceptible to loss through leaching. One of the most widely used is calcium nitrate (15% nitrogen content), which is suitable for acidic soils. Ammoniacal fertilisers, which have a more prolonged effect (a few weeks or, in rather low temperatures, a few months). These include ammonium sulphate, with a nitrogen content of 20-21%, suitable for alkaline soils. Nitro-ammoniacal fertilisers, which have intermediate characteristics. Ammonium nitrate has a nitrogen content of 26 to 33%, suitable for alkaline soils. Part of the ammoniacal	Direct effect: For **Italy**, the normalized emission due to the Direct contribution is equal, respectively to: 4.01-4.15 $kgCO_2eq/kg$ N synthetic fertilizer. For **Spain** the normalized emission due to the Direct contribution is equal, respectively to: 2.78-2.80 $kgCO_2eq/kg$ N synthetic fertilizer. For **Greece** the normalized emission due to the Direct contribution is equal, respectively to: 4.29 $kgCO_2eq/kg$ N synthetic fertilizer. The indirect effect due to the spreading on land of the fertilizer considers the contribution due to the Atmospheric deposition and to the Nitrogen leaching and run-off. It will be reported for both the category defined as "chemical nitrogen fertilization" and "organic nitrogen fertilization" because it considers the effects due to the use of the chemical and organic fertilizers. For **Italy**, the normalized emission due to the Indirect contribution is equal, respectively to: 3.52E-1 – 3.85E-1 $kgCO_2eq/kg$ N fertilizer.	The evaluation has to be made through the multiplication of the kg N equivalent content of the nitrogen fertilizer applied on field for the specific emission factor present in the previous column. *It is important to consider that the value reported is expressed in terms of kg N eq so it is necessary that the value for which it has to be multiplied is converted from kg N fertilizer to its equivalent content of kg N.	*NIR (2024) Italian Greenhouse Gas National inventory report.* *NIR (2023) Spanish Greenhouse Gas National inventory report.* *NIR (2023) Greek Greenhouse Gas National inventory report.*

	nitrogen is lost through volatilisation as it turns into ammonia.	For **Spain** the normalized emission due to the Indirect contribution is equal, respectively to: 7.82E-1 – 7.96E-1 kgCO_2eq/kg N fertilizer. For **Greece** the normalized emission due to the Indirect contribution is equal, respectively to: 6.01E-1 – 6.06E-1 kgCO_2eq/kg N fertilizer. **The contribution due to the use of the chemical fertilizer has to consider the emissions due to the use-on-land of it, Direct and Indirect, which shall be summed in the calculation.**		
ORGANIC NITROGEN FERTILIZATION	Nitrogen can be applied with either organic materials such as feather or blood meal, compost, or a leguminous cover crop. Organic fertilizers contain their nitrogen tied up in proteins, which break down into amino acids, which break down by microbial action into nitrate and ammonium, which the plants take up. Organic materials have the benefit or disadvantage of being slow release and are less likely to leach into ground or surface waters.	Direct effect: For **Italy** the normalized emission due to the Direct is equal, respectively to: 4.29-4.42 kgCO_2eq/kg N organic fertilizer. For **Spain** the normalized emission due to the Direct contribution is equal, respectively to: 2.20-2.21 kgCO_2eq/kg N organic fertilizer. For **Greece** the normalized emission due to the Direct contribution is equal, respectively to: 4.42-4.45 kgCO_2eq/kg N organic fertilizer. The indirect effect due to the spreading on land of the fertilizer considers the contribution due to the Atmospheric deposition and to the Nitrogen leaching and run-off. It will be reported for both the category defined as "chemical nitrogen fertilization" and "organic nitrogen fertilization" because it considers the effects due to the use of the chemical and organic fertilizers. For **Italy**, the normalized emission due to the Indirect contribution is equal, respectively to: 3.52E-1 – 3.85E-1 kgCO_2eq/kg N fertilizer.	The evaluation has to be made through the multiplication of the kg N equivalent content of the nitrogen fertilizer applied on field for the specific emission factor present in the previous column. *It is important to consider that the value reported is expressed in terms of kg N so it is necessary that the value for which it has to be multiplied is converted from kg N fertilizer to the equivalent content of kg N.	*NIR (2024) Italian Greenhouse Gas National inventory report. (see Table 5.36 "N_2O emissions from managed soils" at page 279 of the NIR (2024)).* *NIR (2023) Spanish Greenhouse Gas National inventory report* *NIR (2023) Greek Greenhouse Gas National inventory report.*

		For **Spain** the normalized emission due to the Indirect contribution is equal, respectively to: 7.82E-1 – 7.96E-1 $kgCO_2eq$/kg N fertilizer. For **Greece** the normalized emission due to the Indirect contribution is equal, respectively to: 6.01E-1 – 6.06E-1 $kgCO_2eq$/kg N fertilizer. **The contribution due to the use of the chemical fertilizer has to consider the emissions due to the use-on-land of it, Direct and Indirect, which shall be summed in the calculation.**		
CHEMICAL FERTILIZATION (EXPRESSED AS N-P-K)	The fertilisers used in olive growing are: ammonium nitrate, calcium nitrate, potassium nitrate, sodium nitrate, ammonium sulphate, copper sulphate, iron sulphate, magnesium sulphate, manganese sulphate, zinc sulphate, potassium sulphate, dicalcium phosphate, monoammonium phosphate, monocalcium phosphate and urea. Mineral fertilisers are divided into simple, if made from a single nutrient; or compound, when made from mixtures of several salts, and as complex if the chemical mixture is made from several nutrients. Simple nitrogenous fertilisers are divided into nitric and ammoniacal. Nitric nitrogenous fertilisers (sodium nitrate 5-6% N content, calcium nitrate 15-16% N content, and ammonium nitrate 26% nitric nitrogen and 13% ammoniacal nitrogen content) are those most readily utilised by the plant, as the nitric ion is directly and easily absorbed by the root system. Ammonium nitrogenous fertilisers are characterised by a slower action than the previous	In case an N-P-K fertilizer is used, its GWP impact due to use-on-land can be calculated by decomposing its content in terms of kilograms of Nitrogen (as N) and calculating the GWP impact by multiplying its N content (as kg N eq) by the impact reported in the cell "Chemical nitrogen fertilization." **The contribution due to the use of the chemical fertilizer (as N-P-K) must account for the sum of emissions from its use-on-land, considering both Direct and Indirect emissions.** This approach focuses exclusively on the nitrogen component of the N-P-K compound because greenhouse gas emissions related to the phosphorus (P) and potassium (K) components (resulting from use-on-land) are negligible. Therefore, the calculation is based solely on the nitrogen content of the N-P-K fertilizer applied. For this reason, we propose referencing the value provided in the cell defined for the activity "Chemical nitrogen fertilization."	*Please refer to the respective cell defined for the activity "Chemical nitrogen fertilization".*	*Please refer to the respective cell defined for the activity "Chemical nitrogen fertilization".*

	ones and are ammonium sulphate (20-21% N content) and anhydrous ammonia (82% N content). Fertilisers containing synthetic organic nitrogen have agronomic characteristics that are quite similar to the ammonia compounds and refer to calcium-cyanamide (20-21% N) and urea (46% N). Phosphate fertilisers are simple mineral fertilisers that contain phosphorus (in different forms and solubilities) and sometimes secondary elements or trace elements and refer mainly to simple superphosphate (18-21% P content). Potassic fertilisers are simple mineral fertilisers containing potassium in one or more forms and solubilities, and refer mainly to potassium chloride (60% K, 45-47% Cl), and potassium sulphate (50-52% K). Complex fertilisers are fertilisers consisting of mixtures of salts (binary, if consisting of only two nutrients (NK, PK, NP) or ternary (NPK)). Compound fertilisers contain more than one nutrient and are potassium nitrate (13% N, 46% K), diammonium phosphate (18% N and 47% P), and magnesium sulphate (20% S and 25% Mg). Finally, organo-mineral fertilisers contain a mixture of one or more organic fertilisers (waste substances such as fermented manure and poultry manure, or humic substances) with one or more mineral fertilisers (simple or compound). The organic matrix must be declared and contribute no less than 5% to the product.			
SHREDDING AND REMOVAL OF PRUNING RESIDUES	An important contribution in terms of savings in nitrogen fertilization, could be represented by the addition to the soil of the shredded pruning leftovers. In this case it is reported that there is an accumulated amount of nitrogen (N), phosphorus (P) and potassium (K) that could	The emission factor due to the shredding of pruning residues includes the following activities: **Transfer to the field:** This refers to the distance traveled by the shredder (1 km) from the location where equipment is stored to the field where shredding will take place.	For the calculation of the related impact due to the shredding of pruning residues and their use-on-land, it is necessary to subtract the first contribution from the second, as follows:	*Ecoinvent 3.10. dataset "Mowing, by motor mower {GLO}| market for mowing, by motor mower | Cut-off, U".*

	be estimated respectively as equal to 7 kg/ha, 0.8 kg/ha and 4.2 kg/ha. If, instead, just the removal of the shredded leftovers is evaluated, the benefits due to their application will not be accounted.	**Fieldwork:** This refers to the operations performed over the area being worked, calculated per hectare of surface. **Transfer to farm:** same as transfer to field, but backwards. The dataset inventory accounts for all contributions related to shredding, including fuel consumption, agricultural machinery usage, infrastructure (e.g., tool sheds), air emissions from combustion, and soil emissions due to abrasion. The corresponding emission values, calculated per kilogram of olives produced, are: **7.62E-3 kg CO_2 eq/kg** for olives produced in Spain. **2.03E-2 kg CO_2 eq/kg** for olives produced in Italy. Under different pruning conditions—light pruning and heavy pruning—the amount of carbon dioxide captured per kilogram of dry biomass from pruning residues varies. Specifically, **1.67 kg CO_2** is captured per kilogram of dry pruning remains under light pruning, while **2 kg CO_2** is captured per kilogram of dry pruning remains under heavy pruning.	The **first contribution** is calculated by multiplying the emission factors related to shredding by the kilograms of olives produced. The **second contribution** is determined by multiplying the emission factors related to the carbon dioxide stock (kg CO_2) by the amount of pruning residues (in kg). For shredding and subsequent removal of the prunings from the field, it is sufficient to consider the impact due to the multiplication of the emission factors related to shredding by the kilograms of olives produced. The reference to kilograms of olives was made to adapt the shredding impact to the specific context of the olive grove. Specifically, the dataset is set to obtain the values per kilogram of olives, both in Spain and Italy. This approach is based on the Ecoinvent datasets "Olive {ES}| olive production | Cut-off, U" and "Olive {IT}| olive production | Cut-off, U."	*Ecoinvent 3.10. datasets "Olive {ES}| olive production | Cut-off, U" and "Olive {IT}| olive production | Cut-off, U".* *SUSTAINOLIVE project.*
NO TILLAGE WITH BARE SOIL	This involves keeping the soil weed-free by applying herbicides, without any tillage. A limiting factor in some soils could be the reduced soil water infiltration. Organic matter is not supplied through this system (except for the leaves falling naturally off the olive trees). Consequently, CO_2 fixation does not occur, although existing matter is not lost. Many active chemicals can be applied and with different goals (e.g. diuron and simazine, terbuthylazine and flazasulfuron, glyphosate,	The quantity of applied herbicides may vary between 1.13 kg/ha and 5.18 kg/ha. This variability is due to the different type of olive crops considered (i.e. high slope, extensive, medium density, etc…) and also to the sub-type (that is rainfed or irrigated). Therefore, the emission factor could vary among 13.2 and 60.6 kgCO2eq/ha.	For the production phase of the herbicides, the emission factors have to be multiplied for the amount of herbicides used per ha of olive field involved.	*Ecoinvent 3.10* *L. Fernández-Lobato, B. Ruiz-Carrasco, M. Tostado-Véliz, F. Jurado, D. Vera. Environmental impact of the most representative Spanish olive oil farming systems: A life cycle assessment study (Journal of Cleaner Production 442 (2024) 141169).*

	etc…). Among these ones the glyphosate was considered as one of the most commonly used in olive growing.			*Production techniques in olive growing (International Olive Council)*
NO TILLAGE	It can be considered corresponding to grassing, which involves the development of spontaneous herbaceous vegetation (natural grassing) or sown (artificial grassing). It can extend to the entire surface or be limited to the inter-row and, depending on the climatic conditions and duration, it can be permanent or temporary. With grassing, all the disadvantages related to processing are eliminated, such as: erosion, formation of the working sole, damage to the root system, bringing the less fertile layers of soil to the surface. Furthermore, grassing is useful for safeguarding biodiversity, creating suitable habitats for useful insects. To manage grassing, periodic mowing is carried out to control the height of the vegetation and favour the less competitive species; every 3-4 years, scarification is carried out to oxygenate the soil. Grassing is the preferred soil management practice when there is no problem of water availability, which would determine the establishment of competition for water between the olive trees and the spontaneous or artificial flora of the grassing.	Different scenarios are involved in the evaluation, that are: 1. permanent artificial grassing and soil mechanical management, 2. green cover with leguminous species and soil mechanical management, 3. green cover with leguminous with green manure. 4. temporary natural grassing and soil mechanical management The first three practices have a GHG (positive) impact that could be considered equal to 1.17 - 1.20 $tCO_2eq/ha/year$, while the (positive) impact for the 4th practice above it would be equal to 1.03 $tCO_2eq/ha/year$.	The impact, will be evaluated through the multiplication of each practice for the hectares of olive field involved in the project. If more practices were involved each emission factor has to be multiplied for the respective area (hectares) interested by the practice.	*LIFE project OLIVE4CLIMATE (calculated according to the IPCC, 2006 - Vol. 4 cap. 2 - Eq. 2.25).* *José Luis Vicente-Vicente, Roberto García-Ruiz, Rosa Francaviglia, Eduardo Aguilera, Pete Smith. (2016). Soil carbon sequestration rates under Mediterranean woody crops using recommended management practices: A meta-analysis, Agriculture, Ecosystems & Environment, Volume 235,Pages 204-214, ISSN 0167-8809*
MINIMUM TILLAGE/ REDUCED TILLAGE	With minimum soil tillage, a substantial part (at least 30%) of the soil is not worked and remains covered by residues. The soil treatments proposed are: - Simple surface tillage with a disc harrow or milling 8-20 cm deep. - Milling or tillage with a disc harrow only on the row (strips from 5-10 to 20-30	The practices in the minimum and reduced tillage are considered equivalent in terms of working operations. In both cases the working operation was considered applicable to both the practices described, that are: Simple surface tillage and milling or tillage with a disc harrow. The working operation considered was milling/harrowing only on the row	The impact can be calculated by multiplying the emission factor reported in the cell for the respective hectares involved.	*LIFE project OLIVE4CLIMATE.*

	cm) leaving the inter-row intact where the depth reached varies from 5 to 30 cm.	with a positive impact equal to 0.55 - 1.10 tCO_2eq/ha/yr.		
FULL-FIELD TILLAGE – BARE SOIL BY (MECHANICAL) TILLAGE	The full-field tillage and the bare soil by (mechanical) tillage were reported together because it is estimated that there is no substantial difference in terms of working operation for both of them.	The emission factor was calculated by considering the Tillage working operation in olive fields based in Italy and in Spain. The tillage operation considered was harrowing, by rotary harrow and it was considered an allocation factor expressed in ha/kg olive produced. This factor is similar for Spain and Italy and equal to circa 4E-4ha/kg olive for Spain and 4,65E-4ha/kg olive for Italy. This values generate an impact equal to 3.4e-2kgCO2eq/kg olive for Italy and 2.93e-2kgCO2eq/kg olive for Spain. These values generate an impact equal to 0.15tCO_2eq/ha/yr.	The impact can be calculated by multiplying the emission factor reported in the cell for the respective hectares involved by the specific type of full-field tillage or bare soil by (mechanical) tillage.	*LIFE project OLIVE4CLIMATE.*
GRAZING ANIMALS	The effect, in terms of GHG emissions, due to grazing animals on the field is mainly related to "Urine and dung from grazing animals (FPRP)" for the emissions of N_2O, enteric fermentation expressed in terms of CH_4 and manure management, also expressed in terms of CH_4.	Due to the fact that the equations involved in the estimate of the values take into account specific parameters that depend on the management of the livestock, it is best to adopt specific data for each country that can be retrieved from IPCC and adapted for the calculation. The variability is particularly high among the different countries for N_2O emissions due to the grazing of animals, while there is a lower variability in terms of the CH_4 emission due to the enteric fermentation and manure management. To this end it will be reported below just the contribution for the Italian scenario that will have to be adapted for each country involved. For what concerns the contribution due to the N_2O emissions from manure management the calculation was done by multiplying the kg N_2O/kg N excreted for different animals (i.e. 0.02 for dairy, non-dairy and buffalo and 0.01 for sheep and other animals as goats, horses and mules and asses) for the kg N excreted grazing/head/yr, to get the EF expressed as kg N_2O/head/yr. For CH_4 emissions due to the enteric fermentation and manure management the values are expressed as kgCH_4/head/yr.	For determining the CO_2 impact it is requested to multiply the EF (as calculated for the Italian scenario), reported in terms of kg CO_2/head/yr, for the heads that graze in the olive crop based on each different animal species and multiplying it for the grazing period of the year.	*NIR (2024) Italian Greenhouse Gas National inventory report. 5.2 (3A) e 5.3 (3B). Table 5.14, Table 5.24, Tab. 5.25* *(IPCC, 2006)*

		By summing up all the values above defined and by the application of the specific characterization factor it is possible to get the EFs reported as kg CO_2/head/yr. For 2022 for Italy the following data are reported: Dairy Cattle: 4,920 kg CO_2eq/head/yr Non-Dairy Cattle: 1,710 kg CO_2eq /head/yr Buffalo: 2,750 kg CO_2eq /head/yr Sheep: 277 kg CO_2eq /head/yr Goats: 194 kg CO_2eq /head/yr Horses: 675 kg CO_2eq /head/yr Mules and asses: 406 kg CO_2eq /head/yr. Laying hens, broilers and other poultry: 2.71 kg CO_2eq /head/yr. **Note that the data above reported for the Italian scenario have to be adapted with the specific data for Spain and Greece following the same methodology.**		

Table 2 - Baseline activity data with their related definition and emission factors

8. LEAKAGE

Leakage is defined as the displacement of GHG emissions to another location due to actions in one location, thereby counteracting some or all of the desired mitigation effects (IPCC, 2022).

For example, reforesting sheep pasture land in one site may lead to additional land clearing to make room for additional sheep pasture in another country to meet constant demand. Leakage, also, can take the form of activity shifting, where farmers reduce activity in one area but increase in other areas e.g. by moving stock to another farm. Leakage can also arise due to market effects, where carbon farming actions reduce output, and this can lead to price rises that stimulate increased production elsewhere.

This “waterbed” effect reduces the actual mitigation impact of the carbon farming, as pushing down emissions in one area causes ripple effects elsewhere.

Since carbon leakage represents an indirect emission that could occur outside the project boundaries and is difficult to estimate, only potential leakages within the company's boundaries will be monitored.

A leakage effect percentage (expressed in terms of non-recoverable CO_2 credits) is defined as 5% of the net CO_2eq removals for all projects. This value is based on a bibliographic analysis[1] of potential leakage risks in carbon farming contexts within olive cultivation in the Mediterranean area. If the project proponent wishes to adopt a more precise assessment, they can conduct a specific leakage risk analysis supported by documented objective evidence.
The fixed percentage is considered valid by default by the Program Operator of the Protocol and will be monitored and modified in future versions of the Protocol if deemed necessary.

Net GHG emission reductions are quantified as:

$$ER_{NET,t} = ER_t - LK_{ER,t}$$

Where:
$ER_{NET,t}$ = Estimated net GHG emission reductions in year t (t CO2e)
ER_t = reductions in year t (t CO2e)
$LK_{ER,t}$ = Leakage allocated to GHG emission reductions in year t (t CO2e)

t is the year considered for calculation, year 10 for CF project / year 5 for first monitoring of CF project.

9. METHODOLOGY FOR EMISSION REDUCTION AND CARBON REMOVAL CALCULATION

The general principle from which the calculations for net carbon removals are developed, forms the foundation of the methodology and is consistent with approaches established in sector-specific literature (e.g., UNFCCC AR-ACM0003 CDM, 2013; IPCC, 2003, 2006; Verra VM-0042, 2023). It allows for the estimation of net carbon removals achieved through the application of carbon farming practices, accounting for sequestration gains and associated emissions:

NET REMOVALS =BASELINE (BE) + PROJECT EMISSIONS (PE) - CARBON FARMING (CF)

Where:

- **Net removals** represent the carbon sequestration achieved through carbon farming practices, net of project-related emissions.
- **Carbon farming (CF)** refers to carbon sequestration in biomass and soil following the implementation of these practices.
- **Baseline (BE)** represents the business-as-usual (BAU) scenario in the absence of carbon farming.
- **Project emissions (PE)** are emissions generated by the implementation of carbon farming techniques (e.g., additional tractor passes increasing diesel consumption).

For all quantification procedures, please refer to **Annex 1** of the Protocol, which is dedicated to the methodology. The project proponent shall always consult the most recent published version of the methodology (Annex 1).

10. BUFFER MECHANISM

To secure permanence of the carbon sequestration, a buffer system has been held in place. A discount-based approach is defined, where a certain percentage of calculated/estimated carbon removals is excluded from carbon certification,

[1] In general, a sector review was conducted to define the average parameter (expressed in percentage terms) for the leakage due to the emissions related to different contributions that could affect agricultural practices, which are, as reported in the VM0042 of the VCS Methodology (2024): New Application of Organic Amendments from Outside the project area, the contribution due to the Livestock Displacement, to the Productivity Declines and to the Diversion of Biomass Residues Used for Energy Applications.
Due to the practices considered above the contribution should be mainly due to the extra manure-C (expressed as 12% of the manure-C content), the productivity decline (if >5%) and the displacement of livestock.
In the methodology of the American Carbon Registry a default value of 20% market leakage is considered (reported in “Avoided conversion of grasslands and shrublands to crop production”). Also in other methodologies (as defined in the Climate Action Reserve “U.S. Soil Enrichment Protocol v 1.1” and in the “U.S. Grassland Protocol Version 2.1” it is respectively reported that leakage accounts for displacement of livestock and decline in crop yields (if >5%) and that 20% leakage effect is due to the displacement of livestock and crop yields reduction.

which compensates for the uncertainty and potential risk of reversal. This amount is not made available for certification after the activity or monitoring period. According to the Protocol Monitoring period is the same as the activity period.

To simplify the Project design and its monitoring, **a fixed percentage of 7% is defined**.

For the Project validation this fixed percentage will be applied to the estimated total carbon removals of the project (in case of Group project it will be applied to the amount estimated per each project participant).

For the Project verification this fixed percentage will be applied to the calculated total carbon removals for the considered monitoring period of the project (in case of Group project it will be applied to the amount estimated per each project participant).

The buffer credits shall be deposited in a pooled buffer account property of the Program Operator.

The table below synthetizes the calculation and use of buffer.

	VALIDATION	**VERIFICATION 1**	**VERIFICATION 2**
Net removals (tCO_2e)	Estimated Period = year 0 → year 10	Calculated Period = year 0 → year 5	Calculated Period = year 6 → year 10
Buffer (tCO_2e)	Estimated Net removals (tCO_2e) * 7%	Calculated Net removals (tCO_2e) * 7% Written in the Monitoring Report Recorded in the buffer account of the Program Operator	Calculated Net removals (tCO_2e) * 7% Written in the Monitoring Report Recorded in the buffer account of the Program Operator
Project Credits (tCO_2e)	Estimated Net removals (tCO_2e) - Buffer (tCO_2e)	Calculated Net removals (tCO_2e) - Buffer (tCO_2e) Written in the Monitoring Report Recorded in the Registry	Calculated Net removals (tCO_2e) - Buffer (tCO_2e) Written in the Monitoring Report Recorded in the Registry

Table 3 – Buffer use and calculation method

The percentage defined is fixed and will be tested in the projects that will apply. It is important to consider that the Program Operator will supervise the percentage considered for the buffer mechanism according to the latest regulations from the EU and from the related updates on the sector, so this value will possibly be subject to revisions in future.

The first mandatory monitoring report shall be submitted after 5 years. However, the project proponent may, at their discretion, request additional verification steps prior to this timeframe, each of which will correspond to an additional monitoring report.

11. PROJECT DURATION, PROJECT DATING AND CREDITING PERIOD

The choice of the crediting period is based on sector literature and on the most relevant methodologies in the field. The fixed, non-renewable crediting period for projects generated from the Protocol shall be **10 years**.
Such choice is supported by the following reasons documented in sector literature:

- Crediting periods of less than 10 years seem too short to ensure long-term storage of carbon in soil and biomass in agricultural systems.
- A period of 5 years also would be a minimum to detect changes in soil carbon with sufficient certainty, as small increases compared to a large carbon stock will be difficult to measure on a short term.
- Crediting periods longer than 5 years would be favoured, in order to better ensure the permanence of the GHG reduction/removal activities.

The project duration and the crediting period are defined as coinciding, both lasting 10 years starting from the project's starting date. The land shall be continuously cultivated throughout the entire project duration.
Project dating shall start from the moment in time in which the projects activities start to be applied effectively in the field
Project activities must be implemented on agricultural or grassland from the project start date. The start date of the project shall coincide with the start date of the crediting period. The project start date may be set retroactively with respect to the submission date of the Project Design Document (PDD), meaning that field activities may begin before the PDD is drafted. However, activities implemented prior to October 21, 2023—the official start date of the Life OliVER project—will not be accepted. Moreover, the project proponent must demonstrate that these activities were already aligned with the scope of the Life OliVER project at that time.

12. PROJECT ACTIVITIES MONITORING

Robust Monitoring, Reporting and Verification (MRV) is essential to ensure that GHG mitigation and carbon removals have environmental integrity and are real, additional, measurable, permanent and avoid double counting.

The Project Proponent shall perform the monitoring of the project during all the project duration.
The monitoring (and its verification by the VVB) is fundamental to assure the correct quantification of the amount of GHGs (tCO_2eq) reduced/removed by the project.
Since from the Project design, and depending on the characteristics of the Project itself, the Project Proponent shall define the Monitoring Plan.
The Monitoring Plan is assessed during the Validation activity by the VVB to check if it is adequate to assure proper monitoring of the project throughout its duration and thus to ensure that the GHG emission reductions and removals generated by a project will be measurable and verifiable.
Once the project starts its activity, the Project Proponent shall apply the Monitoring Plan.
The Monitoring Plan includes details about monitoring parameters, schedules and process. It also must describe the entire system employed by a project proponent for obtaining, recording, compiling and analysing GHG data and information. Furthermore, a description of the roles and responsibilities of people involved in the monitoring activity shall be defined.
The Monitoring Plan is verified by the VVB during the Verification to confirm its correct application. During the Verification, the VVB must assess the relevant data quality management procedures for generating verifiable GHG data and avoiding material errors in reported GHG emission reductions and removals.
While assessing the Monitoring Plan, the VVB considers:

- data monitoring, calibration of monitoring equipment or other similar procedures which need to be consistently performed (as per validated information);
- appropriateness of the default factors and standards used (e.g. if they are from a publicly available, reputable and recognized source - IPCC or published government data, etc.), and suitability for the given source, sink or reservoir;

- if the means of implementation of the monitoring plan are sufficient to ensure that emission reductions/removals achieved by/resulting from the project can be reported ex-post and verified
- adequate management of data uncertainty and risks for material error performed by Project Proponent through data controls and quality assurance checks;
- record-keeping practices which must assure sufficient levels of documentary evidence to support assessment against all relevant criteria;
- controls and procedures in place to avoid intentional or unintentional alteration or destruction of data;
- controls in place to ensure participating staff are sufficiently qualified and trained.

Overall, the Project Proponent needs to demonstrate sufficient management oversight on the monitoring procedures.

It shall be ensured that all project records and documentation are maintained and archived a minimum of 10 years following the end of the project duration.

The first mandatory monitoring report shall be submitted after 5 years. However, the project proponent may, at their discretion, request additional verification steps prior to this timeframe, each of which will correspond to an additional monitoring report. For all details on monitoring report preparation, please refer to **Annex 4**.

13. STAKEHOLDER ENGAGEMENT, SOCIAL AND ENVIRONMENTALBENEFITS, RELATED SDGs

The aim of the stakeholder engagement is to involve them in discussing potential environmental, social and economic impacts of projects complying with the Protocol. Stakeholders can help to highlight both positive contributions and potential risks connected to the design, planning, implementation and operational stages of the projects.

13.1 TIMING OF THE STAKEHOLDERS CONSULTATION

The Stakeholder Consultation shall be conducted before the start date of the project. In case the Stakeholder Consultation is conducted after the start date of the project, the Project Proponent shall:

a. provide clarification on why the stakeholder consultation is not conducted before the project start date, AND
b. conduct consultation with relevant stakeholders as early as possible, in any case before the validation activity by the Validation and Verification Body (VVB) starts.

13.2 MINIMUM PARTICIPANTS IN THE STAKEHOLDERS CONSULTATION

The Project Proponent shall identify and invite all relevant stakeholders for consultations and comments. The relevant stakeholders include, but are not limited to, the following:

- Local people, communities and/or representatives who are expected to be directly or indirectly affected (both in a positive and negative way) by the project or may have an interest in the project,
- Holders with land-tenure rights within or adjacent to the project area,
- Local policymakers and representatives of local authorities, especially involved in agricultural, environmental and social aspects,

- NGOs that are active in respect of social and environmental aspects of agricultural management at the national level, or at the sub-national level in the environs of the project area, as appropriate,
- Others as necessary.

13.3 ORGANIZATION OF THE STAKEHOLDERS CONSULTATION

The Project Proponent shall identify and invite all relevant stakeholders for consultations.

The Project Proponent shall provide to VVB the list of all relevant stakeholders and the evidence that invitations were sent, and comments were invited from the listed stakeholders.

The Project Proponent shall invite the stakeholders at least 30 days before the meeting.

The meeting shall be organized *on site* and opportunity for remote connection can also be provided to increase participation.

The stakeholder consultations shall be open to anyone wishing to attend and participate. The Project Proponent shall not deny anyone access to the consultation, even if it was not on the guest list.

13.4 INFORMATION TO BE MADE AVAILABLE TO STAKEHOLDERS

Prior to the physical meeting, the Project Proponent shall share information in a manner (format, medium, language(s), etc.) that allows local stakeholders to understand how the project is likely to affect them. The information to be made available to stakeholders shall include, as a minimum:

1) a non–technical summary of the project, including information on project design, activities, objectives, scale, duration, and implementation plan (so far as known) and how it is likely to affect the various stakeholder groups,
2) a summary of the economic, social and environmental impacts of the project,
3) a summary of likely contributions of the project to Sustainable Development Goals (SDGs),
4) other relevant information to help stakeholders understand the project design, implementation and operation,
5) a preliminary agenda for the Stakeholder Consultation event summarizing the different topics that will be discussed in the physical meeting,
6) information and link for remote participation (if organized),
7) the contact details of the Project Proponent to get further information,
8) the instructions (means and methods) to provide feedback for those who are not able to join the physical meeting.

This prior information shall be provided at least 5 working days in advance before the planned physical meeting.

13.5 PHYSICAL MEETING(S) AND FEEDBACK

The objective of the physical meeting is to inform the relevant stakeholders of the project details and ensure that stakeholders have an opportunity to influence project design, implementation and operation by interacting with the Project Proponent and exchanging views and concerns in a free and transparent manner.

If deemed useful for better involvement, more meetings can be organized by the Project Proponent (each meeting is to be organized applying same rules).

The Project Proponent shall ensure that the place and timing of the physical meeting(s) are appropriate for all relevant stakeholders and do not pose a barrier to participation.

During the physical meeting(s) the Project Proponent shall:

- provide summary of project information (information on project design, technology, objectives, scale, duration, implementation plan; economic, social and environmental impacts of the project; contributions of the project to SDGs; other relevant information)
- ensure that the discussion covers stakeholder's perceptions and expectations about project benefits and potential adverse impacts
- provide information on next steps and contact details (including continuous input and grievance mechanism).

The Project Proponent shall prepare and make available to Stakeholders and VVB a written report of the physical meting(s). A list of all stakeholders attending (both physically and remotely) the meeting shall be included in the report.

After the physical meeting(s), the stakeholders have 5 working days to submit further feedback and comments to the Project Proponent.

Within 1 month from the physical meeting(s) the Project Proponent shall prepare a document summarizing the comments and feedback received from the stakeholders and how they have been taken into account. In case a comment was not addressed, a justification shall be provided. This document (as well as revised project documents, etc.) shall be made available to Stakeholders and to VVB.

13.6 CONTINUOUS INPUT AND GRIEVANCE MECHANISM

The Project Proponent shall set up a formal input, feedback, and grievance mechanism with the purpose of providing stakeholders with the opportunity to submit any feedback or grievance during the entire project lifetime.

The Project Proponent shall record all comments, inputs, concerns, etc. raised by the stakeholders verbally, telephonically, via email, etc.

Periodically, based on the time and content of the communications received, the Project Proponent shall keep the stakeholders informed of the comment(s) received and the measures taken.

The Project Proponent shall provide information in the monitoring report on the comments/inputs/concerns/etc. that have been identified and raised by stakeholders during the period of project implementation and the measures put in place to address them.

14. PROCEDURES FOR VALIDATION AND VERIFICATION OF PROJECTS AND ISSUANCE OF CREDITS

Once the Project Proponent finalises the project description in the Project Design Document, it shall have the project validated by an approved validation/verification body (VVB). The validation process determines whether the project meets the applicable rules and requirements. Once the VVB concludes the validation, the Project Proponent may submit the project for registration. The Validation Report shall be sent by the Project Proponent to the Program Operator. The Program Operator confirms the Validation Report countersigning it and sending it back to the Project Proponent. The Project Proponent sends this finalized version of the Validation Report to the selected applicable Registry. The Registry lists the Project within the validated ones.

The Project Proponent monitors and measures the GHGs emission reductions or removals for the defined monitoring period. The Project Proponent shall complete the monitoring report and have the project verified by an approved VVB.

Once the VVB concludes the verification, the Project Proponent shall submit the Verification Report to the Program Operator for the issuance of the credits. The Program Operator will confirm the credits to be issued (based on Verification Report and on the amount of CO_2eq confirmed in it) writing the number of credits in a specific section of the Verification Report. This finalized Verification Report is sent back by the program Operator to the Project Proponent. The Project Proponent submits this version of Verification Report to the applicable Registry. The Registry lists the Project within the verified ones and publishes the issued credits and all the relevant project documentation.

For the registration of the Validated Project, the Verified Project and the recording of the issued credits the Project Proponent shall respect additional operating rules established by the selected Registry.

The typical flow of a project from its design and until the issuance of credits is summarized in Figure XX below.

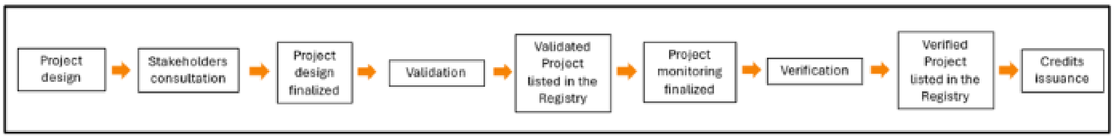

Figure 3 - Project flow from design to credits issuance

In case of Group Projects the "Project Proponent" is the subject entitled by the whole group to interact with the VVB.

14.1 VALIDATION PROCESS

Once ready for validation, the Project Proponent chooses a validation/verification body (VVB) from those listed in the LIFE project and/or Program Operator and/or selected Registry websites and stipulates the contract for the Validation activity.

The VVB carries out the validation activity.

The VVB receives from the Project Proponent the following documents, as minimum:

- Project design document
- Documents containing the calculation applied to estimate the amount of GHGs (tCO_2eq) that will be reduced/removed by the project
- Evidence from the stakeholders consultation (as per section "Stakeholder engagement, social and environmental benefits, related SDGs").

The Validation can be performed on site or off site at the discretion of the VVB.

The Validation consists of the review of the documentation to check if it is compliant to the Protocol requirements. To carry out this evaluation the VVB also asks to Project Proponent for the other supporting documents deemed necessary (e.g. contracts, bibliographical sources, etc.).

The Validation also includes interviews of Project Proponent by the VVB.

As a result, the VVB formalizes a draft Validation Report where the project is summarized, and the raised Corrective Action Requirements (CARs), the Clarification requests (CLs) and the Opportunities for Improvement (OFIs) are detailed.

In case Corrective Action Requirements (CARs) and / or Clarification requests (CLs) are raised, the VVB agrees with the Project Proponent the deadline for the implementation of the necessary actions by the Project Proponent and the transmission of the relevant documents to the VVB.

Once the VVB receives the required information and documents it evaluates if the CARs and the CLs can be considered addressed. If it is so, the VVB issues the final Validation Report. Otherwise, the same iter is repeated until a positive resolution of open CARs and CLs is reached.

It is not possible to issue a final Validation Report if there are open CARs and CLs.

Once ready, the final Validation Report is sent for internal review to be carried out by the VVB. After positive internal review, the final approved Validation Report is formally sent by the VVB to the Project Proponent.

The Project Proponent then sends the final Validation Report to the Program Operator. The Program Operator validates the Validation Report, countersigns it and sends it back to the Project Proponent.

The Project Proponent then sends the final countersigned Validation Report to the Registry in order to have the project listed among the validated ones.

14.2 VERIFICATION PROCESS

Once ready for verification, the Project Proponent chooses a VVB from those listed in the LIFE project and/or Program Operator and/or selected Registry websites and stipulates the contract for the Verification activity.

The VVB carries out the verification activity.

The VVB receives from the Project Proponent the following documents, as minimum:

- Project design document (as previously validated)
- Final Validation Report
- Monitoring report
- Documents containing the calculation applied to quantify the amount of GHGs (tCO_2eq) reduced/removed by the project in the monitored period
- In case of Group Projects, the agreement signed by each group Participant stating its contribution to the project and the percentage of issued credits it will receive
- Any other useful evidence.

The Verification is performed partially on site and partially off site. An on-site visit is always required to confirm how the project has been realized and is implemented on the ground. In case of Group Project the on-site visit will include areas of all involved Project Participants in a proportional way.

The Verification consists of the review of the documentation to check if it is compliant to the Protocol requirements and to confirm if the project is being correctly realized and monitored. It also includes the assessment of the Monitoring report and the related recordings. The required-on site measurements are also done by the VVB in the extent deemed necessary. The VVB checks the calculations done by the Project Proponent to quantify the amount of GHGs (tCO_2eq) reduced/removed by the project.

To carry out the Verification, the VVB also asks to the Project Proponent for the other supporting documents deemed necessary (e.g. contracts, bibliographical sources, etc.) and conducts the necessary interviews.

As a result, the VVB formalizes a draft Verification Report where the project is summarized as well as the amount of GHGs (tCO_2eq) reduced/removed by its implementation during the monitored period. The raised Corrective Action Requirements (CARs), the Clarification requests (CLs) and the Opportunities for Improvement (OFIs) are detailed in such a draft Verification Report.

In case Corrective Action Requirements (CARs) and / or Clarification requests (CLs) are raised, the VVB agrees with the Project Proponent the deadline for the implementation of the necessary actions by the Project Proponent and the transmission of the relevant documents to the VVB.

Once the VVB receives the required information and documents it evaluates if the CARs and the CLs can be considered addressed. If it is so, the VVB issues the final Verification Report. Otherwise, the same iter is repeated until a positive resolution of open CARs and CLs is reached.

It is not possible to issue a final Verification Report if there are open CARs and CLs.

Once ready, the final Verification Report is sent for internal review to be carried out by the VVB. After positive internal review, the final approved Verification Report is formally sent by the VVB to the Project Proponent.

The Project Proponent then sends the final Verification Report to the Program Operator. The Program Operator validates the Verification Report, includes the number of issued credits according to the verified tons of CO_2eq, countersigns it and sends it back to the Project Proponent.

The Project Proponent then sends the final countersigned Verification Report to the Registry in order to have the project listed among the verified ones.

14.3 ISSUANCE OF CREDITS

After the positive conclusion of the Validation and Verification activities, the Project Proponent can have the credits issued for its Project.

In case of Group Project the issued credits are assigned to each Project Participant as stated in the signed agreement.

The Registry publishes the credits as recorded in the Verification Report countersigned by the Program Operator. The credits are recorded in the Registry in the Project Proponent account according to specific Registry rules.

15. REQUIREMENTS FOR REGISTRATION AND PUBLIC CONSULTATION OF PROJECTS AND CREDITS

Any project generated in accordance with the Protocol, to sell VERs (Verified Emission Reduction) after the carbon credits issuance shall be registered on a public Registry having the following characteristics:

- The registry must be publicly accessible and available internationally.
- The registry must provide public access to underlying project information including, at minimum, project descriptions and design documents, monitoring reports, and validation and verification reports.
- The registry must individually identify units through unique serial numbers.
- The registry must identify credit status including, at minimum, “issued”, “retired” and “optioned”.
- The registry must have publicly available rules and procedures including: issued under procedures that provide for their permanent retirement; traceable back to the relevant GHG project; have measures for avoiding double counting, e.g. where a GHG emission reduction or GHG removal enhancement is claimed by more than one entity, and for avoiding double claiming between entities and national governments.

The public registry approved by the Program Operator is the eCO2care VER Registry [https://www.eco2care.org]. Future modifications on this matter may be made, if necessary, in light of the potential approval of a European carbon registry directly managed by European Union bodies.

16. DOCUMENT HISTORY AND PROTOCOL VERSIONS

The new version of the document is effective on Issue Date

VERSION	ISSUE DATE	COMMENT
1.0	20/12/2024	Initial version elaborated as deliverable D2.1 of Life OliVER Project, to develop a protocol for olive sector access to the voluntary carbon market.

Table 4 – Protocol history

The protocol is always accompanied by the following annexes:

- Annex 1: Methodology for emission reductions and carbon removals calculation;
- Annex 2: Requirements for VVBs;
- Annex 3: Project Design Document Template and Requirements
- Annex 4: Monitoring Report

To consult them, please refer to the most recent published and prevailing versions available.

17. BIBLIOGRAPHY

Almagro M., López J., Boix-Fayos C., Albaladejo J., Martínez- Mena M. (2010). Belowground carbon allocation patterns in a dry Mediterranean ecosystem: A comparison of two models. Soil Biology & Biochemistry 42, 1549-1557. https://doi.org/10.1016/j.soilbio.2010.05.031.

G. Pardo, A. del Prado, M. Martínez-Mena, M.A. Bustamante, J.A. Rodríguez Martín, J. Álvaro-Fuentes, R. Moral. (2017). Orchard and horticulture systems in Spanish Mediterranean coastal areas: Is there a real possibility to contribute to C sequestration? Agriculture, Ecosystems & Environment. Volume 238. Pages 153-167, https://doi.org/10.1016/j.agee.2016.09.034.

Gold Standard, 2022. STAKEHOLDER CONSULTATION AND ENGAGEMENT REQUIREMENTS, Publication 14/06/2022, Version 2.1. Available at: https://globalgoals.goldstandard.org/standards/102_V2.1_PAR_Stakeholder-Consultation-Requirements.pdf

ISO/IEC Directives Part 2 edition 9 (2021) https://www.iec.ch/standards-development/isoiec-directives-part-2

IPCC, Penman J., Gytarsky M., Hiraishi T., Krug T., Kruger D., Pipatti R., Buendia L., Miwa K., Ngara T., Tanabe K., Wagner F., 2003: Good Practice Guidance for Land Use, Land-Use Change and Forestry. IPCC National Greenhouse gas inventory programme.

IPCC, Aalde H., Gonzalez P., Gytarsky M., Krug T., Kurz W. A., Lasco R. D., Martino D. L., McConkey B. G., Ogle S., Paustian K., Raison J., Ravindranath N.H., Schoene D., Smith P., Somogyi Z., van Amstel A., Verchot l., 2006: Guidelines for National Greenhouse Gas Inventories - Volume 4: Agriculture, Forestry and Other Land Use.

UNFCCC, AR-ACM0003: Afforestation and reforestation of lands except wetlands, Version 2.0, 2013.

LIFE15 CCM/IT/000141 OLIVE4CLIMATE, 2016-2019, STANDARD FOR SUSTAINABILITY CREDITS FROM SUSTAINABLE OLIVE GROVE MANAGEMENT.

Available at: https://olive4climate.eu/wp-content/uploads/5.-Annex-C5.3-a-Standard-per-la-quantificazione-e-lattestazione-dei-crediti-di-sostenibilit%C3%A0-derivanti-dalla-Gestione-Sostenibile-degli-Oliveti_022020.pdf

LIFE20 PRE IT/017, C-FARMs, CARBON FARMING CERTIFICATION SCHEME STANDARD. Available at: https://c-farms.eu/wp-content/uploads/2023/04/STANDARD-CARBON-FARMING-STORAGE-Public-Consultation-ENG.pdf

Gold Standard, 2021. TRANSITION REQUIREMENTS v.2.0. Available at: https://globalgoals.goldstandard.org/106-par-transition-requirements/

VCS Module VMD0001, 2023. Estimation of carbon stocks in the above and below ground biomass in live tree and non-tree pools (CP-AB), v1.2. Available at: https://verra.org/wp-content/uploads/2023/11/VMD0001-Estimation-of-Carbon-Stocks-in-Above-and-Belowground-Biomass-in-Live-Tree-and-Non-tree-Pools-CP-AB-v1.2.pdf

VCS Program Definitions. VERRA 29 August 2023 v.4.4

VCS, VM0042, METHODOLOGY FOR IMPROVED AGRICULTURAL LAND MANAGEMENT Version 2.0, 2023.

VCS, AFOLU Non-Permanence Risk Tool. 12 October 2023 v.4.2

VCS, Registration and Issuance Process. 4 October 2023 v.4.4

European Parliament, 2021. CARBON FARMING, MAKING AGRICULTURE FIT FOR 2030. Available at: https://www.europarl.europa.eu/RegData/etudes/STUD/2021/695482/IPOL_STU(2021)695482_EN.pdf

European Parliament, 2024. Proposal for a Regulation of the European Parliament and of the Council establishing a Union certification framework for carbon removals. https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52022PC0672

LIFE19 PRE FI001. LIFE CARBON FARMING SCHEME FINAL REPORT: GUIDANCE FOR FUTURE CARBON FARMING SCHEMES. BEST PRACTICES FOR EXPANDING CARBON SEQUESTRATION ACTIVITIES, 2022. Available at: https://content.st1.fi/sites/default/files/2022-06/LIFE%20Carbon%20Farming%20Scheme%20final%20report%2001062022.pdf

Paolotti et al. (2016). Combining livestock and tree crops to improve sustainability in agriculture: a case study using the LCAapproach. Journal of Cleaner Production.

Francaviglia, R., Di Bene, C., Farina, R., & Salvati, L. (2017). Soil organic carbon sequestration and tillage systems in the Mediterranean Basin: a data mining approach. Nutrient Cycling in Agroecosystems, 107(1), 125-10-137.

World Bank. 2021. Soil Organic Carbon MRV Sourcebook for Agricultural Landscapes © World Bank, Washington, DC