

An aerial photograph of agricultural fields, showing various shades of green and brown, with a white road or path winding through the landscape.

**METHODOLOGY FOR IMPROVING AND
REPORTING THE LEVEL OF SEQUESTERED
CARBON IN THE SOIL IN THE AGRICULTURAL
SECTOR**

A second aerial photograph of agricultural fields, showing various shades of green and brown, with a white road or path winding through the landscape.

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GLOSSARY

ABBREVIATION	GLOSSARY OF ABBREVIATIONS
APSA	Agricultural Producer Support Act
CCLA	Climate Change Limitation Act
GTIN	Global Trade Item Number
IMS	Integrated management system
ISAC02	Integrated system for administration, control, and reporting
ISAC	Integrated system for administration and control
LOAL	Law on the ownership and use of agricultural lands
LPAL	Law for the Protection of Agricultural Lands
LCPR	Law on the cadastre and property register
MA	Ministry of agriculture
OC	Organic carbon
SFA	State fund of "Agriculture"
SFA EMS	State fund agriculture electronic management system
SOC	Soil organic carbon
QES	Qualified electronic signature
TOC	Total organic carbon
VAT	Value added tax
GLOSSARY OF TERMS	DEFINITION
Accredited laboratory	An accredited laboratory is an official recognition of competence for the performance of specific activities authorized by a specialized state body.
Additionality	Implementation of new good agricultural practices or investments above the mandatory legal requirements
Administrative contract	A contract in a framework agreement, which is concluded in implementation of a project under the CARBONSAFE Program.
Agricultural activity	The production of agricultural products, including harvesting, milk production, rearing and breeding of farm animals for agricultural purposes and/or maintaining the land in good agricultural and ecological condition.
Agricultural crops	Plants of a given botanical species and genus that are cultivated by man to satisfy certain of his needs.

Agricultural areas	Arable land (including fallow), pasture, permanent grass, permanent crops, and family gardens whether used for agricultural production.
Agricultural machinery	Equipment that is used for soil cultivation and harvesting, such as: tractors, self-propelled machinery - wheeled tractors, tracked tractors, specialized self-propelled machines (forage harvesters, grain harvesters, etc.) and other types of self-propelled machinery and interchangeable attachments, including when they are used in livestock facilities.
Agriculture	All units used for agricultural activities and managed by a farmer, located on the territory of the same agricultural holding.
Audit	An independent and systematic, documented process of obtaining objective evidence and evaluating it objectively to determine the extent to which the audit criteria are satisfied. Determining the fit between requirements and performance.
Audit mission	An independent documented process of one and/or several persons collecting and certifying facts for the fulfillment of certain requirements.
Baseline	Practices applied and soil organic carbon content, prior to project availability.
Baseline soil sample	A baseline of soil organic carbon content against which subsequent measurement and analysis of the result is performed.
Buffer	A mechanism with the role of a guarantee fund that guarantees the permanence and sustainability of the project and serves as insurance against force majeure events.
Calculation period	The period between two points in time for which a change in carbon stocks is achieved. In the current methodology, this is the period between the baseline soil sample and the control soil sample.
Carbon dioxide	Carbon dioxide (carbon dioxide) is a chemical compound. Chemical formula CO ₂ . Colorless and odorless gas It is obtained as a product of the respiration of living organisms, as well as during combustion. It participates as a starting substance in the photosynthesis of plants. Its accumulation in larger than normal amounts in the atmosphere leads to a greenhouse effect.
Carbon credit	One ton of carbon dioxide equals one carbon credit that is no longer emitted into the atmosphere. A carbon credit is a tradable permit or certificate. The main purpose of creating carbon credits is the reduction of carbon dioxide emissions from industrial activities. 1 carbon credit is equal to 250 kg of carbon in the soil. Approximately formed on 4 decares.

Carbon certificate	A carbon certificate is a document that certifies that one carbon credit is equal to one certificate.
Carbon Credit Trading	Carbon markets are trading systems in which carbon credits are sold and bought.
CARBONSAFE Program	It represents a system of sustainable agricultural practices based on regenerative agriculture, which aim to improve the content of organic matter and organic carbon in the soil, increase the capture of greenhouse gases and their storage during the monitoring period.
Cell	The territory, with a minimum size of 4 ha and a maximum size of 25 ha, from which an average soil sample is formed.
Check list	A document that serves to fill in, calculate and analyze data for the purpose of proving and certifying facts and arguments. To be completed by the Controlling Organization.
Controlling organization	CARBONSAFE LTD., in its capacity as the owner of the Methodology, carries out the activity of controlling, monitoring, and reporting the projects under the CARBONSAFE Program.
Control soil sample	Follow-up soil measurement in the next 4 economic years after the baseline soil organic carbon content, against which the result analysis is performed. It is carried out by the Controlling organization.
Digital data on land use	Files containing a Geographic Information System (GIS) for creating, manipulating, storing, analyzing, and visualizing geographically bound (spatial) data for mapping the surveyed territory.
Documents	A package of documents containing all information on the implementation of the CARBONSAFE Carbon Program.
First Party/Internal Audit	A first-party audit is an internal audit carried out across the organization or on behalf of the organization for the purpose of an activity declaration review.
Individual strategy	An individual document for the implementation of science-based, good agricultural practices, developed for each farm.
Irregularity	Any violation of the CARBONSAFE Program rules.
ISAC02	Specialized software for Integrated Administration, Control and Reporting System.
KML file	A specific file format for expressing geographic annotation and visualization, store's locations, image overlays, video links, and modeling information such as lines, shapes, 3D images, and points.
Land area	A land area is defined as the collection of land properties belonging to a given settlement (i.e., land properties both within and outside the settlement area).

Land property	Land property is a part of the earth's surface, including that which is permanently covered with water, defined by boundaries according to the right of ownership.
Macroelements	Chemical elements: K, Ca, N, Mg, P, S.
Methodology	The current methodology is for measuring and accounting for differences in organic carbon C in soil formed by removal of atmospheric carbon dioxide CO ₂ and its storage.
Microelements	Chemical elements: Cu, Mn, Zn, B, Fe, Mo, Na.
Monitoring	Monitoring the implementation and reporting the results of the projects participating in the CARBONSAFE program.
Monitoring of carbon credits	Tracking of issued carbon credits for projects participating in the CARBONSAFE Program.
NUTS	Classification of territorial units for statistical purposes in Bulgaria (NUTS) according to Regulation (EC) No. 1059/2003 of the European Parliament
Operator	A legal entity or a natural person who is registered as an Agricultural holding from the Plant Breeding and/or Plant Breeding with Livestock sector and is implementing a project under the CARBONSAFE Program.
Organic carbon (OC)	A compound of carbon without carbides, oxides, carbonic acid and its derivatives.
Organic matter (OM)	A collection of the remains of plant and animal organisms, subjected to decomposition to varying degrees (a process known as "mineralization").
Perennials	Areas occupied by fruit and vine plantations, bamboo, mulberry, reed, wicker for basket weaving, honey-bearing tree species to produce honey, other fast-growing shrubs and tree species used for bioenergy production, berry orchards, nurseries for vine planting material, fruit trees, ornamental shrubs and forest saplings and other plantings with a vegetation period of more than two years.
Program	CARBONSAFE program is implemented in one project "Bulgaria" - BG, which is divided into 6 project areas on a territorial basis - Planning areas according to "NUTS II codes".
Programming period	A period of 5 business years surveying the same areas/plots for sequestered carbon with the possibility of extension for a further 5 years.
Project area	A project area is defined on a territorial basis, based on the use of agricultural land.
Project	The project is determined on a territorial basis, based on a legal basis for the use of agricultural land with a duration of at least 5 economic years.

Public Registry	Public register for registering Methodologies/Standards, Projects and issuing the carbon credit certificates generated by them.
Regenerative agriculture	A farming system that is based on several different parameters and practices, such as minimum tillage, use of cover crops and active crop rotation, use of organic fertilization, healthy management of plant residues and reduced fuel use, stimulating the implementation of rotational grazing of the places where animal husbandry is developed.
Registration of a farmer	The registration of an agricultural producer according to Ordinance No. 3 of 29.01.1999. to create and maintain a register of agricultural producers.
Register	A document that serves to fill in, calculate and analyze data for the purpose of proving and certifying facts and arguments. To be completed by the Controlling Organization and/or authorized body.
Second Party/External Audit	A second-party audit is an external audit and is performed by parties (clients) and/or on their behalf who have an interest/relationship with/to the organization.
Sequestered carbon	A biological process of capture, retention, and long-term storage of carbon in the soil.
Site visit	Visit to the areas of the Operator's farm included under the CARBONSAFE Program to verify the stated facts.
Soil organic carbon (SOC)	Soil organic carbon is a component of soil organic matter. Organic matter consists mainly of carbon (58%), with the remaining mass consisting of water and other nutrients such as nitrogen and potassium.
Shape file	A specific file format created for a geographic format for recording the spatial location and attribute information of geographic objects.
Technology map	A document that serves to fill in the calculation and analysis of data to prove and certify facts carried out on the cells/plots in the agricultural holding participating in the CARBONSAFE Program. To be completed by the Operator.
Third Party/External Audit	A third-party audit is an external audit and is carried out by external independent auditing organizations that provide compliance certification/registration.
Total organic carbon (TOC)	Quantity of carbon that is converted into carbon dioxide by combustion and which is not liberated as carbon dioxide by acid treatment.
Units of measure/Coefficients	1 hectare is = 10 decare. 1 decare is = 0.1 hectare.

	1 ton of SOC = 3.667 carbon credits
Validation/Confirmation	Confirmation, by providing objective evidence, that the requirements defined in the CARBONSAFE Program
VCM (Voluntary carbon market)	VCM is a decentralized market where private actors voluntarily buy and sell carbon credits that represent certified removals or reductions of greenhouse gases.
Verification/Verification	Confirmation, by providing objective evidence, that the specified requirements in the CARBONSAFE Program methodology have been met.



I. INTRODUCTION

The present methodology¹ for removal of atmospheric carbon dioxide CO₂ and its storage in the soil as carbon C, provides a set of rules, procedures and requirements, which confirm the removal and reduction of CO₂, and which conform with the conditions for certification /payment. The present mechanism has two major goals:

- ✓ It guarantees that carbon credits are real, measurable, additional, that they do not lead to leakage, are not double reported and are sustainable.
- ✓ It assists the large-scale adoption and application so that the potential mitigating effect can be increased to the maximum.

The methodology provides reasonable assurance through application of the rules set forth in it that CARBONSAFE is a reliable system of management, control, and reporting of the amount of sequestered carbon from agricultural activities in – perennial plants, annual crops and other agricultural crops and will not allow actions, which contradict the European and Bulgarian legislation and are against the interests of society. The basis of the methodology is a credit mechanism whose aim is to encourage and reward only additional new removals of CO₂, i.e., those, which would not arise in the absence of mechanisms/projects for their removal.

The CARBONSAFE methodology refers to four procedures for work:

Appendix 01 „Procedure for drawing up of agronomic prescriptions, recommendations and an individual strategy“;

Appendix 02_Procedure for registration and monitoring of projects in the CARBONSAFE program.

Appendix 03_ Procedure for automatic georeferenced soil sampling.

Appendix 04_Maintenance of the documentation, Team, and resourcing.

¹ A methodology founded on nature-based solutions (NBS) with targeted measures, activities and agronomic recommendations based on the principle of regenerative agriculture and high-tech measurement of the result.

II. SCOPE AND STRUCTURE OF THE METHODOLOGY

The methodology outlines the framework of specific requirements combined with a quantitative evaluation of activities and arrangements of the processes of management, measurement, and reporting of the changes of soil organic carbon (SOC), through the introduction of a science-based system of good agricultural practices. The entire system is subordinated to a methodology that encourages sustainable practices on the grounds of regenerative agriculture aimed at improvement of the organic matter content in the soil, enhancing the capture of greenhouse gases and accomplishing permanent storage of greenhouse gases. **Regenerative agriculture** is a system for agriculture based on several different parameters and practices such as minimum tillage, use of cover crops and active crop rotation, use of organic fertilization, health management of crop residues and reduced use of fuel, encouraging the implementation of rotational grazing in places with developed livestock breeding. As a whole, these practices help improve soil health and lead to increasing the amounts of captured carbon and its sustainable storage in the soil. Additional advantages are the improved infiltration of the water and capture capacity, the increased biodiversity and higher resistance to erosion effects of wind and water. The activities contribute to reducing the carbon footprint and simultaneously stimulate and accelerate the process of sequestration of carbon in the soil. The present methodology is applicable for a wide range of activities and productions – from small farms with low level of technological management of the land to industrial technological production, which uses different tools and approaches for improvement of SOC.

The methodology operates with a single conservative and scientific approach for quantitative estimation of soil organic carbon (SOC), which includes: agronomic assessment of suitability of the agricultural farms, special accredited/validated protocol for georeferenced soil sampling with automatic probe in three depths, laboratory analysis of physical - chemical indicators of the soil samples, by means of an accredited laboratory and drawing up of an individual strategy for application on science-based, good agricultural practices.

1. Baseline

The baseline of each individual project participant is determined on a cell level and documented, through direct measurement of the carbon content in the soil. No alternatives of the baseline are admitted. The baseline is an equivalent of the results from the laboratory chemical analysis of OM (Organic matter) and OC (Organic Carbon),

through taking a georeferenced **basic soil sample** from each plot admissible for participation in the programme. The present methodology guarantees that the quality of the projects and quantitative estimation of the benefits corresponds to the high level of the set goals.

The baseline process before a farmer or plot is included in the Carbonsafe program is developed in document PR0101 - Farm Suitability Assessment Checklist in section PR0101-CL. The form provides farmer data, crop details and existing practices traced back up to 5 years, equipment used. The baseline scenario is defined for each holding registered in the project.

2. Added value of the project or additionality

The added value of the project or additionality is expressed in the used agronomic recommendations, guidelines and activities related to minimum tillage, use of cover crops and active crop rotation, use of appropriate predecessors, use of organic fertilization, healthy management of crop residues and reduced use of fuel, as all of them are implemented in an individual strategy for farm management, which leads to increased SOC, compared to baseline – the basic soil sample. The aim of CARBONSAFE is to introduce new good farming practices whereby farmers commit to undertaking specific environmental and climate practices or investments that they would not otherwise undertake. This targeted activity by CARBONSAFE includes only supra-legal environmental and climatic conditions (called Good Agricultural and Environmental Conditions, GAEC) as well as all kinds of other good practices that are supra-legal and must be met by farmers.

The baseline before implementation of the project should reflect the legal and market conditions under which the carbon removal activity takes place. If a carbon removal activity is imposed on operators by applicable legislation or does not need incentives to take place, its performance will be reflected in the baseline. A carbon removal activity that generates carbon removal in excess of this baseline due to practices that were not applied by farmers prior to the existence of the project due to various reasons and barriers, including financial, should be considered additional. The certification and issuance of carbon credits in favor of farmers will be an additional financial incentive for them, which will compensate them in connection with the implementation of the new more expensive but gentler practices. Carbon credits issued under CARBONSAFE programme are a

transferable, tradable financial instrument that is issued in the name of the farmer and may be traded on his behalf and for his account, against a CARBONSAFE commission. Separately, farmers pay an annual fee per hectare or per cell for sampling and laboratory analyses. The annual fee depends on the types of crops and the size of the fields to be surveyed. It is also possible to pay an administrative fee for filling out documents for which farmers do not have the administrative capacity. The end result is measured through a georeferenced **control soil sample from each cell** from each plot included for participation in the programme. In the absence of a project, no change of the baseline is expected – the content of soil carbon is preserved, and it is even possible that it is decreased. The activities on each project, in addition to contributing to the reduction and removal of CO₂ from the atmosphere, also indisputably prove and register the storage of carbon in the soils, and lead to soil recovery (improvement of soil health) and biodiversity as well.

Additionality is determined for each project participant separately in PR0101- Checklist for assessment of the farm suitability, KL 0101-4. Data for this assessment is collected from PR0201-Application for registration in the CARBON SAFE program, where farmers declare practices applied for the past 5 years. In KL 0101-4 - Additionality, an assessment of additionality is carried out based on the information provided, compared with the practices that should be implemented under the program.

The additionality assessment confirms the fact that these activities did not reach the farmer before the existence of the project but will be subject to the program.

3. Calculation period

The calculation period for each project is the period between two points in time during which a change in the carbon reserves is accomplished and said is calculated and documented. In the present methodology, this is the period between the basic soil sample and the control soil sample. The control sampling shall be carried out within the following business year. The standard period is 12 months, but a timeline of between 10 and 14 months is allowed, which is tailored to crop rotation, crop development and weather conditions. "Business year" means the period from 1 October of the current year to 30 September of the following year. The bulk density is examined once and is used for the

calculations of the entire monitoring period. Bulk density analyses should be made in accredited laboratory.

A bulk density sample is taken for each individual land area from the first participant in the Program, whose plots fall within the boundaries of a land area where no data on measured bulk density is available.

The bulk density sample is taken from areas of the Participant that fall within the scope of the Program, with a specific plot selected randomly.

Bulk density samples are taken from the three soil layers: 0-30 cm, 30-60 cm, and 60-90 cm, and are sent for testing in an accredited laboratory.

The test results for bulk density from a given land area are recorded and used in calculations for every subsequent participant with plots falling within the same land area.

The duration of each project is min. 5 business years for the same areas.

During the calculation period, results for each cell are documented and reported. The results of the control soil sample are compared with the results obtained from the base soil sample for the content of organic carbon in the soil. The control results of each year become the baseline for the next year.

Soil sample	Result
Base	Baseline
Control 1	1 st control minus base
Control 2	2 nd control minus 1 st control
Control 3	3 rd control minus 2 nd control
Control 4	4 th control minus 3 rd control

Calculation scheme 1

Cells for which there is a documented increase in SOC stocks are subject to inspection for verification and issuance of carbon credit certificates. The previous year's baseline becomes the next year's baseline.

For cells in which no change or a decrease in SOC levels was reported, the baseline remained the same as that measured in the first year. These cells must continue to be monitored and will be subject to verification and issuance of carbon credit certificates

only if an increase in SOC levels above the baseline is reported in a subsequent period within the credit period.

In the event that in a subsequent reporting period there is a drop in SOC levels in cells for which carbon credit certificates have already been issued, the differences should be compensated by the Buffer.

4. Crediting period

Crediting period and validity of carbon credits issued - the issuance of carbon credit certificates is the time period during which the impacts on the overall objective can be accounted for, including the observation and monitoring period. The lending period is at least 5 years. The validity of certified carbon removal should depend on the expected duration of storage and the various reversal risks associated with the given carbon removal activity. To account for this risk, the validity of certified carbon removals generated by carbon farming and soil carbon storage should be subject to an expiry date corresponding to the end of the relevant monitoring period (the credit period). The carbon should then be assumed to be released to the atmosphere unless the economic operator demonstrates the maintenance of carbon storage through continuous monitoring activities as follows:

- After the expiry of the 5-year crediting period, the client is given the opportunity to extend the contract for another 5 years. The extension of the contract does not interrupt the certification process, but the baseline should be reviewed and redefined. For the new period, the farm must have the opportunity and potential to introduce new, supra-legal agricultural practices. In this case, the validity is extended by the duration of the contract. Certification and issuance of carbon credits in favor of farmers will continue to be an additional financial incentive for them, which will compensate them in relation to their ability to maintain implemented practices and/or exercise new ones.

- Conclusion of a contract only for monitoring the implemented new agricultural practices and monitoring their correct implementation. In this case, the validity is extended by the period of exercising the monitoring.

All credits under the CARBONSAFE program are issued "ex-post", that is, as a result of a prepared report and calculations for events that have already occurred, reflecting the real change in carbon stocks in the soil.

At the end of the crediting period and project closure, SOC levels may be increased, unchanged or decreased, taking into account the overall balance achieved at the project participant level.

In the event that, after the completion of the project, the total balance /total for all cells/ at the project participant level shows data of a drop in SOC levels, the drops should be covered by the Buffer.

5. Leakage

Leakage – the current methodology is strictly conservative, as it refers to facts based on periodic calculations including the stock of nutrients in the soil and does not admit leakages or at least does not create prerequisites. A leakage occurs when the stimulated mechanisms for removals of CO₂ lead to increased emission or decreased absorption in other places, thus reducing the total impact on climate, which is not observed with CARBONSAFE. The CARBONSAFE program monitors and keeps records of the existence of preconditions for leaks. In the event of force majeure circumstances beyond CARBONSAFE's control or a decline in (SOC) stocks is observed, the Methodology provides for the accounting of leakages and the respective reduction of the quantities for issuing certificates for carbon credits, which will be covered by the buffer account.

6. Uncertainty

Uncertainty is avoided by introduction of a system of chemical, physical and mathematical calculations, which are the result of accredited laboratory chemical analysis of the taken georeferenced soil samples. All data is recorded, registered and reported in an Integrated system for administration, control and accounting (ISACO₂) of the „captured“ carbon from plant species – perennial plants, annual crops and other agricultural crops.

7. Permanence of the projects

Permanence of the projects is secured by the additional activities, which guarantee the absence of reduced produce yield, and even lead to its increase, at the same time contributing to improvement of soil health and biodiversity and to increasing the percentage of humus in the soil. The issued agronomic recommendations also lead to optimization of revenues from agricultural activity. CARBONSAFE offers an opportunity to also measure the micro- and macro- elements in the soil for farmers implementing projects and drawing of the relevant maps along with issuance of recommendations based

on shared costs. This further encourages farmers to declare their desire to implement a project. The activities listed are related to the impermanence risk management.

8. Sustainability of the projects

Sustainability of the projects is guaranteed through the approaches detailed above for increasing of the co-benefits.

9. Buffer

Buffer account – although the CARBONSAFE methodology is extremely conservative and does not need a buffer mechanism, one is envisaged, in the amount of 5%. All CO₂ removals are reduced by 5%, being set aside in a buffer account. The buffer is aimed at guaranteeing the permanence and sustainability of the projects, and also serves as insurance against force majeure events. It acts as a guarantee fund that covers all risks of possible leaks or unforeseen fluctuations in SOC levels.

The buffer mechanism ensures that even when SOC levels drop, already issued carbon credit certificates remain valid and reliable.

In the event of a drop in the SOC level in any cell, the loss is covered by the buffer reserve. If monitoring shows a stable accumulation of SOC, at the end of the crediting period, the contribution to the project participant's buffer reserve can be released and traded.

When declines are identified, an increase in the buffer rate or a change in management practices is required to address the causes of the decline.

10. Double reporting

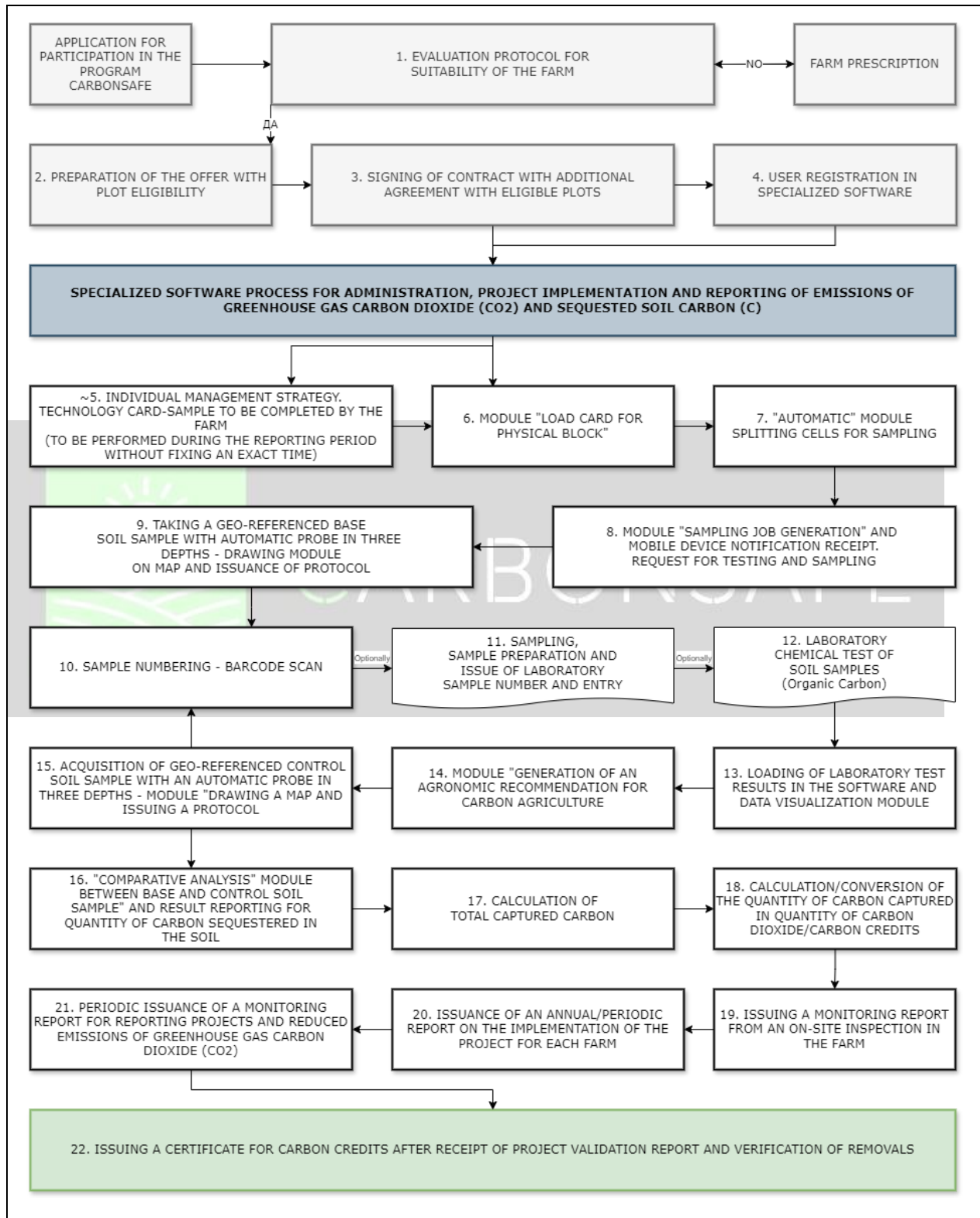
Double reporting of projects and emissions is impossible. Each project is registered with a unique registration code ID, pursuant to Appendix 02 “Procedure for registration and monitoring of projects in the CARBONSAFE programme”. The contractors of projects sign a “Declaration for double reporting”, part of the “Application for registration in a CARBONSAFE programme” to Appendix 02 “Procedure for registration and monitoring of projects in the CARBONSAFE programme”, by virtue of which they certify that they are not part of another programme for implementation of a similar project (SOC. If such a fact is ascertained in the process of work, then payments shall not be effected to such projects and they shall be registered into a register of “Bad faith projects”, part of Application 02 “Procedure for registration and monitoring of projects in the CARBONSAFE programme”. When payments are made and double counting is established, the corresponding amount

of issued carbon credits is covered by the provided buffer, which is duly reported in the register. The relevant authorities shall be informed by the due procedure of the attempted fraud. All CARBONSAFE projects and their carbon removals are registered at the following address: www.carbonsafe.bg.

The process of certification under the CARBONSAFE programme cannot be shorter than 12 months and passes through the various assessment modules of ISACO₂, as illustrated in Fig. 1.



Fig.1 Process of CARBONSAFE certification



III. APPLICABILITY OF THE PROJECTS

The projects are admissible on the territory of the Republic of Bulgaria and encompass all lands in agriculture, which fall within a system of land use and taking into account the relevant national specificities. The project activities will be performed on the same land plot as the baseline. Plots falling into wetlands, peatlands and riverbeds are not allowed - they are not part of the National Land Use System. Projects located on the Forest Fund territory are inadmissible. Projects not complying with the requirements set forth in the “Checklist for assessment of the suitability of the farm”, part of Application 01_Procedure for agronomic recommendations and assessment, are not admissible.

IV. PROJECT BOUNDARIES

1) Spatial boundary

This Methodology is valid for the territory of the Republic of Bulgaria. The spatial boundary covers the impacts of activities that are under the control of the project owner. The owner of the project is the relevant farmer who has legal grounds for cultivating the land. The activities must lead to a reduction in emissions and/or carbon sequestration in the soil, leading to an increased SOC content in the project area. All plots in the control system that leave the project without a **georeferenced control soil sample** shall not be accounted for and are considered inadmissible. If new areas are added to the project, they will be documented and certified as new areas - subject to a comprehensive assessment under the certification process, as shown in Fig.1

2) Time frame

The crediting period of SOC projects will be at least 5 business years, with the possibility of being extended.

3) Greenhouse gases

The main greenhouse gas observed with all project activities is CO₂, which is released when working with the equipment in the field. The carbon footprint resulting from the fuel used by farmers to produce the crops is subtracted from the total amount of soil carbon sequestered (SOC). For the purposes of the present methodology, average consumption rates of diesel fuel are used for mechanized activities on crops and groups of crops for one year - in liters per 1 ha, including artificial and permanent meadows -. The data on average fuel consumption are taken from the MZm Methodology for

determining the individual annual quotas in connection with the implementation of the state aid scheme "Aid in the form of a discount on the value of the excise duty on gas oil used in primary agricultural production". Calculations are performed in PR0205 - KL for calculation of sequestered soil carbon (SOC). The conversion into carbon emissions is based on the following equation: 100 l diesel fuel/ha = 340 kg CO₂ /ha. The total fuel consumption (per cell) in tons of CO₂ equivalent is subtracted from the gross amount of tons of greenhouse gas carbon dioxide CO₂ emissions removed by the project and the net amount of tons of greenhouse gas carbon dioxide CO₂ emissions removed is obtained. A coefficient of 3.42 is used to convert the total fuel consumption from tonne/hectare to tonne/CO₂ equivalent.

1l of diesel is equal to 36 MJ (Ordinance No. H-18 of August 8, 2016). 1MJ is equivalent to 95.1 g CO₂ (Methodology for determining the intensity of greenhouse gas emissions from the entire life cycle of fuels and energy of non-biological origin in transport). Therefore $36 * 95.1 / 1000 = 3.42$

VI. CONTROL AND REPORTING OF RESULTS

CARBONSAFE is based on an Integrated System for Administration, Control and Reporting (ISA CO₂) of "captured" carbon from plant species - perennial plants, annual crops and other agricultural crops. The technique involves measuring the amount of "SEQUESTERED" carbon "STORED" in the soil.

The control and reporting of sequestered carbon in the soil is based on a scientific methodology, including agronomic assessment of the suitability of agricultural crops and plant species, a special protocol for georeferenced soil sampling with an automatic probe and chemical laboratory analysis of the soil samples, by means of an accredited laboratory.

Automatic soil sampling is carried out in three soil layers: 0-30 cm; 30-60 cm and 60-90 cm, monitoring the progress of the sampling through an online platform and georeferenced through a mobile application.

The storage of the data for the sampling performed, the issuing of the protocol for the sampling, as well as the mapping and registration of all surveyed areas and the use of a database management system is a key point in the program, as it allows the integration of spatial and non-spatial data.

The process management system is implemented by software for organizing the information in the form of a database. It includes modules for data entry, verification, storage, retrieval, processing, management, security, etc. It is a set of computer software and hardware for collecting, storing, updating, processing, analyzing and visualizing spatial (geographically referenced) information.

The purpose of CARBONSAFE is to guide, report and measure a purposeful process based on the principles of regenerative agriculture, reducing it to a concrete and quantifiable result, which is materialized through the issuance of a Carbon Credit Certificate. The unit of measurement of the Certificate is CARBON CREDIT, which is equal to 272.48 kg. SEQUESTERED carbon, which equates to 1000 kg carbon dioxide CO₂. Therefore **1000 kg sequestered in the soil carbon is equal to 3.667 CARBON CREDITS.**

Calculation: the fraction of carbon in carbon dioxide is related to the ratio of their weights or so-called molar masses. The atomic weight of carbon is 12 atomic mass units /12 grams per mole/, while the weight of carbon dioxide is 44 atomic mass units /the molar mass is 44 grams per mole/. ONE TON of sequestered soil carbon is equal to $44/12 = 11/3 = 3.667$ tons of carbon dioxide (atmospheric) = 3.667 carbon credits. The calculation for each project is carried out in the SOC calculation Checklist, part of Application 02_ Procedure for registration and monitoring of projects in the CARBONSAFE programme.

1. CONTROL AND REPORTING OF SEQUESTERED SOIL CARBON:

The task was solved through the system for control and quantitative reporting of the sequestered carbon in the soil based on chemical laboratory analysis of a soil sample in the depth of layers: 0-30 cm; 30-60 cm; 60-90 cm, taken with an automatic sampling probe, attached to ATV, UTV, tractor, pickup truck, or other types of equipment - (agricultural, forestry, or other off-road machine).

The process begins with the submission of the "Application for registration in the CARBONSAFE programme, part of PR02. The next step is getting to know the specifics of the farm (types of crops, cultivation methods, applied practices, used soil treatments, fertilization rates, etc.) and preparing a suitability assessment (1) - "Farm suitability assessment checklist" for participation in the carbon farming programme CARBONSAFE", part of PR 01. If the farm does not meet the main criteria for admission to the program, a

"Prescription for adaptation" (2) is issued, part of PR 01 and its inclusion is postponed until the prescriptions are removed.

The next step, if the suitability assessment has been successfully passed, is the entering into an Administrative Agreement (3) with the farmer, the organization, the municipality, the state, part of PR02 and its entry into the Programme with a unique ID number in (ISACO₂). The said farmer is entered in the "SOC projects register". The contract has a minimum term of 5 years, and is concluded on a business year basis (from October 1 of the current year to September 30 of the following year/according to the requirements of the respective country). For the participants admitted to the program, an individual strategy is developed for the management of the used areas in the farm (4), part of PR01. Then follows the entry of a user into the software - "Organization/Contracts" module (5), according to PR02. In (ISACO₂), the data from the concluded contracts are entered, as well as the relevant user access roles in the system.

An essential part of the process is the drawing up of an assignment for automatic soil sampling, part of PR02, which is carried out in the following manner:

In (ISACO₂), the plots and their boundaries for sampling are entered, as laid down in the contract, and it is possible to add or remove physical agricultural blocks. The introduction of the information about the areas is carried out through the Module "Loading a map for a physical block" (6) in (ISACO₂), by means of the so-called Shape-files or manual drawing of the plots by loading a ".KML" file from Google Earth. Shape-files are a specific file format, translated shape means a form, i.e. it is a format that "remembers" the shape and position of geographic data. Shape-files are a non-topological (geometric), geographic format for recording the spatial location and attribute information of geographic objects. The Shapefile concept uses five file types with specific extensions. Different file types should be stored together in the same place (in the same directory). They are archived and "uploaded/loaded" together in (ISACO₂), after which a visualization of the respective plots follows.

When forming the sampling task, the types of crops and the area of the individual physical blocks are taken into account, and each plot is reduced to a separate "CELL" for sampling. A sampling cell cannot exceed 25 ha (3% tolerance is allowed). The division of plots into separate cells for sampling is carried out automatically in the Module "Separation of cells for sampling" (7) in (ISACO₂).

The methodology for the correct sampling guarantees the objectivity of the soil analyzes and results. For this reason, soil sampling is performed on the basis of georeferenced data, guaranteeing representativeness for the entire area with a methodology for determining micro-area for sampling with software for monitoring all stages of the process according to rules for storage and transportation of the samples.

The drill operator receives the sampling assignment in (ISACO₂) in the "Mobile application" module (8) of the CARBONSAFE programme in the form of "TASK" and performs the relevant action, according to PR03 "Procedure for automatic georeferenced soil sampling". In the "task", the physical blocks to be sampled and the corresponding crops are loaded, as well as their geo-location. The physical blocks are pre-divided into sampling "cells", which are visualized on the screen of its mobile application. The drill operator - a sounder, proceeds to take a georeferenced BASIC SOIL SAMPLE (9), choosing the path for taking samples from the relevant points, according to the relief, shape and size of the plot.

Sampling with the automatic probe equipped with geo-location software is carried out after entering into a contract with the customer. The sample from each layer of the soil: 0-30 cm; 30-60 cm and 60-90 cm is separated into separate containers on the probe and after sampling from a given "CELL" is completed, each layer /each container is sealed in a separate ziplock envelope. Pre-printed "BARCODE" labels (10) are affixed to each soil sample bag. Next comes scanning of the corresponding barcodes and attachment to the server. The actual sampling process ends with the issuance of a protocol and the sending of the physical samples to the laboratory. The entire sampling process is carried out according to an accredited protocol, accompanied by geo-location of each sample, recording the corresponding coordinates of the specific sample for each layer of the soil.

After the physical acceptance of the soil samples in the accredited laboratory, it is proceeded to a process of sampling and sample preparation (11). Accepted samples are filed under a new label "BARCODE" (laboratory number), which binds the barcode of the field sample already uploaded to the server, which reflects the corresponding depth and geo-location. In this way, there is complete continuity and traceability of the sample path from the field to its acceptance in the laboratory, guaranteeing the anonymity of the sample - eliminating the possibility of manipulation of specific samples. Sample

preparation is related to various treatments of the already accepted soil sample - crushing, grinding, burning and homogenization.

The methods of analysis in the Laboratory (12) are verified and accredited and ensure high accuracy of the analyzed results for:

Ø Organic Matter

Ø (Organic Carbon)

After completion of the chemical analysis of the taken BASE soil samples, the obtained results are entered through Module attachment of a file with results (13) (insert xls.file) in (ISACO₂) of the CARBONSAFE program, according to PR02. The results are entered automatically for each contract, for each physical block, respectively for each "cell" of the sampling, separated by crops. The final result of the chemical analysis reports and measures the amount of sequestered carbon in the soil from the respective crop, on 1 ha. The measurement unit is a carbon credit, as 3.667 CARBON CREDITS are identified with 1 /one/ ton of sequestered soil carbon, which is equal to 3.667 tons of atmospheric carbon dioxide CO₂.

After receiving the laboratory chemical analysis and establishing the amount of sequestered soil carbon (SOC) from the specific crop, a qualified agronomist prepares the relevant recommendations and technological map for carbon farming in Module "Generation of recommendation" (14) of the crop/ plant, which becomes part of the individual strategy for managing the used areas.

For each subsequent economic year, a georeferenced CONTROL SOIL SAMPLE is carried out with an automatic probe at three depths - Module "Map drawing and issuing a protocol" (15), according to PR02. The control sample is taken once every economic year following the year of the Base Soil Sample. The annual control sampling is done according to a schedule, consistent with the type of crop, the crop rotation, the state of the soil and the climatic conditions and the phase of development of the crops that allows the sampling to be carried out. Taking the control soil sample follows the protocol and steps of the basic soil sample.

The difference in the amount of sequestered soil carbon on the date of the control sample, compared to the base sample, is the actual accumulated/sequestered carbon in the soil for a period of one economic year (16) Module "Comparative analysis". The result of the control sample is entered into (ISACO₂) of the CARBONSAFE programme, again checked

by a qualified agronomist and becomes part of the individual strategy for managing the areas used.

The released amount (CO₂) from the equipment used for the production of agricultural crops is calculated and documented in PR00205 for every cell that shows an increase in SOC.

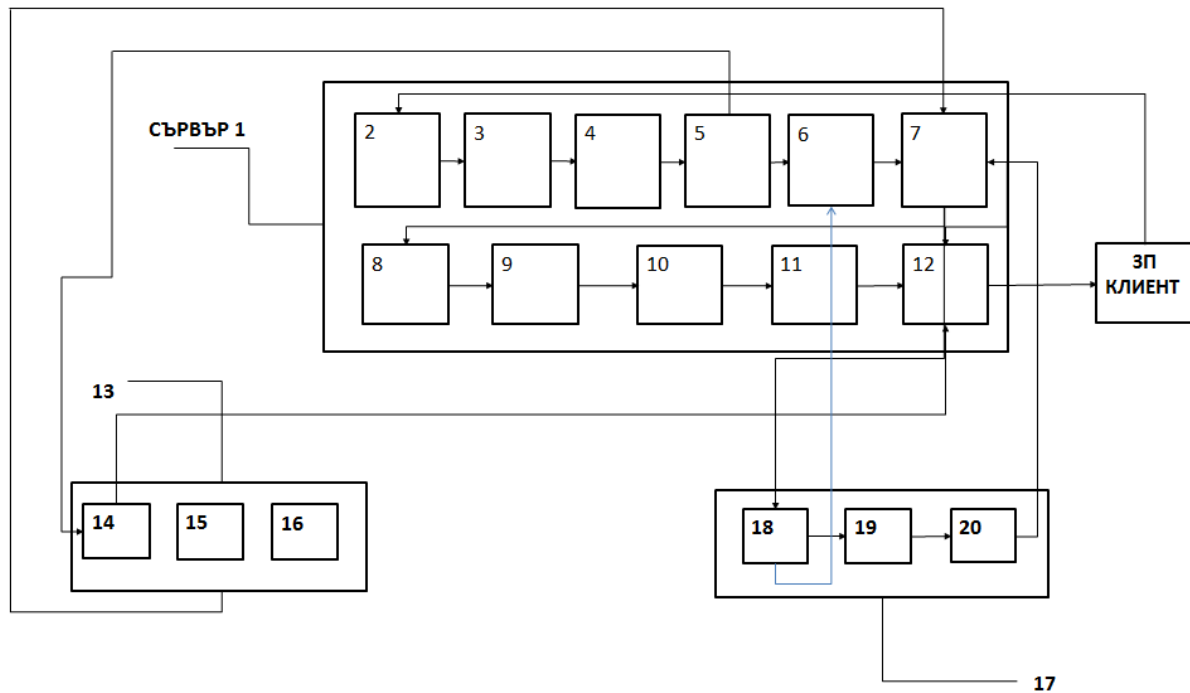
Gross CO₂ removal from the project activity is deducted with the emissions of CO₂ from the fuel consumption deployed to calculate the net removal of CO₂ from the atmosphere and carbon stored in the soil.

VI. INTERACTION OF THE SEPARATE MODULES OF ISACO2

Collected information for the features of the farm of a specific farmer is stored in the module database 2 and an evaluation for suitability is performed and a contract with the candidate is entered into. A unique individual number is entered for each contract. These data are sent to the module for loading of maps 3, outlining plots where data is entered about the boundaries of the plots, their forms and the geographical location. Visualization of the relevant plots is performed, which is sent to the module for separation of the plot into cells 4 where on the basis of the information received from modules 2 and 3 division of the plot into separate cells for sampling is performed. The information from the cell plot division module 4 is sent to the task generation module 5. When formulating the assignment for sampling, the types of crops and the area of the separate physical blocks is taken into account, and each plot of land is reduced down to a separate cell for sampling. The soil sampling is performed based on georeferenced data, guaranteeing representativeness for the entire area with a methodology for sampling micro-area determination. The generated assignment for soil sampling is sent to the visualization data module 6 and through the mobile application 13 of the mobile device of operator 14. In the assignment the physical plots are loaded, divided into cells subject to sampling and the relevant crops, along with their geo-location and are visualized on the screen of the mobile application 13. The operator takes samples by means of the drill 16, which is mounted on a specialized machine 15, from the relevant points, according to the relief, shape and size of the plot, from each layer of the soil at depths 0-30 cm; 30-60 cm and 60-90 cm. The sample is separated in separate vessels of the drill 16 and after finishing the sampling from each layer, they are sealed in a separate envelope on which a barcode is applied, which is scanned and sent to the module for recommendation generation and

issuance of a technological map for carbon farming 7. This information is also sent to the sampling and sample preparation module 18 of the laboratory testing block 17 where the delivered soil sample is crushed, ground, homogenized and a laboratory code is generated, which is sent to the data visualization module 6. The soil sample is moved to the laboratory analysis module 19 where the percentage content of organic carbon is determined and the data is sent to the data storage and retrieval module 20. These data are sent to the recommendation generation module 7 where based on the information received from the mobile application 13, from the data visualization module 6, as well as from the laboratory testing module 17, a recommendation is generated and a technological map for carbon farming is issued, which, through the communications module 12 is sent to the customer/ farmer. The data from the comparative analysis module 8, 9 and 10 are summed up in calculation sheet "Calculation for sequestered soil carbon (SOC)" – PR02/05 where the amount of sequestered soil carbon at the sampling date is reported and compared to the baseline sample. In this way, the actual accumulated/sequestered carbon in the soil for a period of one economic year, the total amount of carbon by the project, the total amount of carbon credits generated by the project are calculated and sent to the report preparation module 11 "Annual/Periodic Report - PR02/ 11". Certificates issued by the Public Register are entered in a register of issued certificates, according to Appendix PR02 "Procedure for registration and monitoring of projects in the CARBONSAFE programme".

Fig.2 Diagram of the interaction of the modules in ISACO₂



VII. MONITORING

The periodic issuance of certificates should be bound to a certain frequency of monitoring and reviews of the effectiveness of the introduced practices of regenerative agriculture. A monitoring report is foreseen from each on-site inspection and performance review in accordance with the principles and requirements of PR01.

An annual/periodic report is submitted, according to PR02 for each project

CARBONSAFE collects and documents evidence that the methodology's applicability conditions are met at all times by electronically archiving all monitoring data collected during the last crediting period up to 2 years after the end of the crediting period.

1. Risk assessment and mitigation

The CARBONSAFE methodology and its associated work procedures, the projects and the certificates issued under CARBONSAFE programme have been verified by a "third party".

Certification systems or other verified third-party systems are taken into account in risk assessment and mitigation procedures when they meet the following criteria:

- ✓ They have the relevant competences of an auditing body;
- ✓ they provide for a publicly available system of requirements that includes at least all the relevant requirements contained in the CARBONSAFE methodology and the work procedures for it, and make it available for use by third parties;
- ✓ they stipulate that a third party carries out appropriate inspections, including on-site visits, at regular intervals, but at least once every 12 months, to verify compliance with the rules in the CARBONSAFE methodology and the work procedures for it;
- ✓ they include methods verified by a third party to track the methods and controls provided for in the CARBONSAFE methodology and the work procedures for it;
- ✓ they include third-party audits to ensure that there are no gaps and deviations in the certification chain, compared to the established and written standards in the CARBONSAFE methodology and its work procedures.

VIII, REPORTING AND ISSUANCE OF CERTIFICATES

The CARBONSAFE program collects and documents data on the projects of all participants and initiates third-party verification, validation of the projects and verification of the removals they generate.

CARBONSAFE program registers the project in the Public Register after receiving a positive validation assessment from a third party.

The CARBONSAFE program requires the issuance of credits from the Public Registry after the data on the removals generated by the project have been verified by a third party.

The CARBONSAFE program submits the data to a Public Registry, being able to trace removals to a specific cell and having the identification of each individual participant generated by an algorithm as follows: <CSBG-42SC-23/27-AGRI-0001> where – CS – is the name of the program, BG is the name of the project, 42SC - is an abbreviation of the planning area - 23/27 - is the corresponding five-year monitoring period - AGRI - is the

sector of implementation of the Program - 0001 - is a consecutive operator/participant in the project .

The public registry issues serial numbers of submitted verified removals.

Carbon credit certificates are issued to each project participant.

