PRATI_CO Parmigiano Reggiano: Agrotecnica organic carbon footprint

Riferimenti
Tipo di progetto
Gruppo Operativo

Acronimo
PRATI_CO

Tematica
Impronta carbonica

Information
Time frame
2016 - 2019

Durata
36 months

Partners (no.)
8

Regione
Emilia-Romagna

Comparto
Zootecnia - bovini/bufalini

Localizzazione
ITH53 - Reggio nell'Emilia

Costo totale
€168.284,32

Fonte di finanziamento principale
Programma di sviluppo rurale

Programma di sviluppo rurale
2014IT06RDRP003: Italy - Rural Development Programme (Regional) - Emilia Romagna

Parole chiave
Landscape /land management
Soil management / functionality
Food quality / processing and nutrition
Agricultural production system

Sito web
http://www.pedologia.net/it/PRATI-CO/cms/Pagina.action?pageAction=&page=InfoSuo...

Project status
completed

Objectives
The project aims to demonstrate the crucial role that stable meadows - typical of the high plain between the provinces of Reggio Emilia and Parma - play in the environmental sustainability of the production of Parmigiano-Reggiano. Another GOI PRATI- CO ending point is to quantify the carbon footprint throughout the production of Parmigiano Reggiano process starting from the ground, in order to define the "guidelines aimed at better management of land to maintenance of organic matter and carbon sequestration "

Activities
The project consists in experimental activities aimed at soil conservation and enhancement of the role of permanent meadows in the carbon kidnapping and agro-environmental sustainability. Focus of the project is to quantify the carbon footprint throughout the Parmigiano Reggiano production process starting from the ground, from which the fodder linked to the production of Parmigiano Reggiano, and including the entire livestock milk production process. The activities will lead to the definition of guidelines for better management of soils in relation to carbon sequestration and maintenance of organic matter.

Partenariato

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Pratice abstract

Description
ACTION 1 MONITORING OF ORGANIC SUBSTANCES IN SUNS AND AGRONOMIC MANAGEMENT
The study of organic matter content will be carried out in typical situations related to the production of Parmigiano Reggiano by identifying 8 monitoring sites in companies associated with GOI. The sites will be chosen according to the agronomic management (stable meadows and meadows of the pasture) and the location and representativeness of the main

pedological environments. In each site the soil will be studied using the drill method and the opening of special pedological profiles. A special sampling protocol will be used to test the content of organic matter and its variability both in spatial (vertical) and vertical (depending on depth). . Organic analysis will be performed both with Walkley and Blackche method using an elemental analyzer. The use of these two methods in parallel on the same sample is intended to test if there is a coefficient of correlation between the two methods.
The Walkley and Black method is the method used to refer to more than 35,000 organic matter data, taken mainly in the 1990s, related to the Emilian-Romagna plain database database. The elementary analysis method is the reference method of the European Community and the Emilia-Romagna Region has begun to adopt it in some recent soil monitoring.

Results
The study of the organic substance content was carried out in typical situations, connected to the production of Parmigiano Reggiano by identifying 8 monitoring sites in the companies associated with the GOI. The sites were chosen both on the basis of agronomic management (permanent meadows and alfalfa meadows) and the location and representativeness of the main soil environments. The soil was studied at each site using the dutch auger and through the opening of special soil profiles. The organic matter analyzes were performed with the Walkley and Black method and the Elemental Analyzer. The monitoring of the organic substance involved two depths (0-15 cm and 15-30 cm). The sampling methodology consisted of an adaptation of the Area-Frame Randomized Soil Sampling (AFRSS) method (Stolbovoy et al., 2006 modified). In total 96 samples were taken for analysis of organic matter. The results showed the accumulation of carbon in the soil of alfalfa meadows compared to other rotating crops and the accumulation equal to almost double in permanent meadows. Furthermore, the soils cultivated with alfalfa show the scarce difference between the two depths 0-15 and 15-30 cm attributable to plowing. They, even if performed after 4 or 5 years of duration of the alfalfa lawn, cause the first 30-40 cm of depth to be scrambled. In stable meadows there is a greater sequestration of carbon and the particular accumulation in the first 15 cm which highlights the total absence of tillage.

Description
ACTION 2 MONITORING OF SOIL RESPIRATION
The Operational Plan foresees field monitoring based on the evaluation of the organic matter of soils according to agronomic use: stable meadow and varied lawn of grass. Innovative will be the use of a tool able to record the CO2 emitted from the soil and its plant cover.
I.TER intends to test this instrument, verify variability depending on soil use (stable meadow, varied meadow), soil type and seasonal variability. These data will serve to better understand the relationship between organic matter and seizure and CO2 emissions. The CRPA will use the data to validate the modeling interpretation of the carbon sequestration of the soil.
At first, the best response and use of the instrument will be studied in order to establish a reliable survey protocol, as CO2 production is strongly influenced by environmental factors such as soil temperature, atmospheric temperature, soil moisture, content Organic matter, etc.. Measurements will be made on both stable meadows and meadows to see how the soil's breathing varies.

Results
The measurements were carried out by two technicians equipped with West Systems flowmeter, using the technique of the non-stationary static storage chamber. This monitoring has the aim of quantifying and characterizing the diffuse emissions of carbon dioxide from the soil. In total, 600 flow measurements were carried out in 3 farms in which one plot with alfalfa and one with permanent meadow. The measurements were performed in June 2019 and repeated in September of the same year. The isoflow maps have shown a certain trend of greater CO2 emission in permanent meadows which, among other things, obviously coincide with situations with higher humidity and greater content of organic matter. The influence of soil characteristics such as the presence of altered gravel typical of conoid environments has also appeared.

Description
ACTION 3 MODELS FOR EVALUATION OF THE CARBON SEQUESTION IN SOIL AND CARBON IMPRESSION
It is to quantify the magnitude and potential of carbon sequestration for the crops underlying the production of fodder for the

Parmigiano-Reggiano production area: stable meadow and alfalfa.
For the estimate of potential carbon sequestration, the results of some calculation models in relation to the carbon dynamics in the soil (emission / seizure) will be compared with the same input data for the cultivation of the stable lawn in a sample farm. Subsequently, the carbon stored in the soil will be calculated for 2 types of crops (stable meadow, alfalfa). The simulated data will then be validated with the measured data and finally the calculation of the carbon dynamics in soil for stable meadow and alfalfa will be carried out for 4-5 different agricultural management scenarios.
LCA will then quantify the carbon footprint of the farms involved in the project, considering both the agricultural and zootechnical components, between typical crop rotations and feeding of beef. Calculation of the carbon footprint will be related to the product unit (kg of milk) and the surface unit (ha) for the GOI companies

Results
The simulations on the dynamics of carbon in the soils of stable meadows have led to results which, although differing according to the estimation models used, converge in the conclusion: the permanent meadow is able to increase the organic substance of the soil over time, sequestering carbon. The extent of this seizure is conditioned above all by the contributions of organic matter, both from farmed effluents and from crop residues. According to the model estimates, values varying from 0.7 to 10 t /ha of carbon per year can be obtained. These values correspond to a reduction that can go, depending on the farms and estimation models used, from 4 to 30% of the carbon footprint of the milk. In the case of alfalfa, there is substantial stability, due to the lower contribution of organic matter from the effluents, which are distributed only at the end of the crop cycle, every 3-4 years.

Description
ACTION4 INDIVIDUALIZE AND SHARE GUIDES TO HELP THE BEST MANAGEMENT OF SUNS RELATED TO PRODUCTION OF REGGIAN PARMIGIAN FOR THE MAINTENANCE OF ORGANIC SUBSTANCE AND THE CARBON SEQUEST
Define the "Good Farmland Soil Conservation Practices Guidelines" to be validated by farms and GO organizations and will serve to promote and enhance the role of keeper of the farmer's land resource.
The guidelines will take into account the results and the information gathered in the following actions:
1) stable meadow effect and its permanent inertia with respect to the processing of alfalfa plant on the organic matter content;
2) the effect of germination (stable meadow) with respect to processing (alfalfa) on soil protection from erosion;
Support of the action is foreseen to develop a mapping that illustrates the macro geological environments studied through the monitored sites. For each environment, the GOI will describe the agronomic practices advisable for soil conservation, potential feed-to-crop responses and guidance on the main agronomic techniques on carbon sequestration.

Results
This action concerned the definition of the "guidelines of good agronomic practices for soil conservation which have been validated by the farms and bodies participating in the GO. They are functional to the promotion and enhancement of the role of the farmer as custodian of the soil resource.
They provide:
• Use of mature manure on the roof (so as not to cause weeds and also guarantee a good organic carbon content);
• Maximize the distribution of the sewage in the vegetative phases of the neadows (even immediately after cutting) by following an irrigation in the absence of rain;
• In case of degraded stands, resort to seeding with 'perennial' grass and legume species;
• Management of the shift and water volumes based on the characteristics of the soil (loose soils irrigation shift closer, clayey soils higher volumes).

Description
DIVULGATION: I.TER AND CRPA with their respective competences collaborate in the dissemination activities of GO's results and goals.
ITER DIVULGATION

Scientific technical communication: by writing articles, organizing seminars and meetings in the field and on the portal www.pedologia.net.
Sensory and emotional communication: through radio broadcasts of "rural communication" at a radio network to disseminate the results, knowledge and information derived from the work of the GOI.
I.TER will produce a promotional video on issues related to carbon sequestration.
It also envisages the implementation of 3 dissemination panels that will divulge the soil, the seizure, but also the biodiversity of the territory.
Website dedicated to the activities of the GOI, which will include the presentation of the project and the information material. It also envisages the definition of some press releases that will be addressed to the major headlines.
CRPA DIVULGATION
Design and design of coordinated graphic image for project disclosure tools: dedicated web pages, roll-up presentation of the GO plan, custom carpets for material distribution in events.
Layout design with CRPA website.
Sharing information on major social platforms.
Organization and realization of direct technical communication events.
Making product dissemination of results.

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TRAINING ACTIVITY
Co-operation also takes place in training as CRPA and I.TER have decided to start coaching activities in tune with the stages of the plan. A first coaching of I.TER is aimed at the knowledge of corporate soil and the role of organic matter; While CRPA coaching is aimed at the company's livestock sector.

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Link utili

Titolo/Descrizione	Url	Tipologia
Sito web del progetto PRATI-CO	http://www.pedologia.net/it/PRATI-CO/cms/Pagina.action?pageAction=&page=InfoSuo...	Sito web
Link to the interview (Italian)	https://www.youtube.com/watch?v=cmQERMWiK1Q&feature=yo%20utu.be	Materiali utili
video GO PRATI_CO (English)	https://www.youtube.com/watch?v=-a172srV25k	Materiali utili
video GO PRATI_CO (Italian)	https://www.youtube.com/watch?v=ybQXt91sMT4	Materiali utili
Roll Up PRATI_CO	https://www.pedologia.net/userfiles/FileAllegato/files/PRA1_Roll_Up.pdf	Materiali utili
Poster PRATI_CO Rete EIP	https://www.pedologia.net/userfiles/FileAllegato/files/PRATICO_poster.pdf	Materiali utili
Articolo su Quotidiano "La Voce di Reggio Emilia"	https://www.pedologia.net/userfiles/FileAllegato/files/VOCE_31_10_17.pdf	Materiali utili
Comunicato Stampa:	https://www.pedologia.net/userfiles/FileAllegato/files/PRATI-CO_CS-20171030_LAN...	Materiali utili
Articolo su Rivista Agricoltura	https://www.pedologia.net/userfiles/FileAllegato/files/Prati_co_Agricoltura_038...	Materiali utili
Rivista “Informatore Zootecnico	https://www.pedologia.net/userfiles/FileAllegato/files/FilosinBus-Linformatorez...	Materiali utili
Articolo su Quotidiano “La voce di Reggio Emilia”	https://www.pedologia.net/userfiles/FileAllegato/files/FilosinBus-LaVocediReggi...	Materiali utili

Titolo/Descrizione	Url	Tipologia
Articolo su Quotidiano “Gazzetta di Reggio Emilia”	https://www.pedologia.net/userfiles/FileAllegato/files/FilosinBus-GazzettadiReg…	Materiali utili
Comunicato Stampa	https://www.pedologia.net/userfiles/FileAllegato/files/ComunicatoStampaPRATI_CO…	Materiali utili