

Analysis of the results

WP 4 Pilot project implementation

4.5 Follow up activities

GECO2 – Green Economy and CO2

Safety and resilience | SO 2.1

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Description of the results

GECO2 central theme is the development of a Carbon Voluntary Market applied to the Sustainable Agriculture and Nature Based Solutions concept in Adriatic Regions.

The project has developed seven voluntary local carbon markets.

In earlier stages, instruments and documents were created to facilitate testing of the voluntary carbon market in agriculture.

Preliminary research about the international CO₂e market experiences of voluntary and coactive CO₂e credits markets has been realised and the guidelines underlying the technical content of the pilot action defined.

The pilot CO₂e voluntary credits market has been built on project defined rules set.

These rules have been organised into three protocols covering the three basic areas of development of the experimental market system:

- Market protocol
- Calculation system protocol
- Cultivation protocol.

The cultivation protocol includes a selection of ten practices identified by the project to maximize carbon sinking and increase biodiversity and farming resilience.

This choice has been based on the most relevant scientific literature and on results obtained at local level by other projects and on field research.

The calculation system protocol has been at the basis of the creation of GECO2 calculators. These informatic tools assess the present state of the CO₂e balance of the project selected farmers and buyers and allow the calculation of CO₂e credits and debts.

The market protocol defines the rules and the working mechanisms of the GECO2 credits exchange system. The protocol proposed market is characterized by the following key principles: voluntary, open, transparent, regional, low cost, user friendly,

Furthermore, specific documents, earmarked to the participating actors (sellers and buyers of credits), have been prepared defining the commitments made and the development plan (buyer contract, seller agreement and buyers and sellers plans).

Agricultural undertakings, which have agreed to participate in the project, have been identified in each region and the CO₂e absorptions resulting from the adoption of the selected practices, calculated.

Identification of buyers has been also finalized by completing the market cycle test.

The project developed some important operational tools to create a user-friendly access to the market and a fast and low-cost management of the system:

CAFÉ (CARbon Fixing Elaborator)

To facilitate the calculation of CO₂e sequestration capacities, it provides a rapid, homogeneous, and scientifically reliable calculation of the balance of CO₂e emissions and sequestration, a system for calculating the carbon credits that can be generated by an agricultural enterprise (**CAFÉ Carbon Fixing Elaborator**) has been defined. The system makes use of several variables related to climate, soil characteristics, crop and field management, agronomic practices and energy consumption and constitutes the basis for a future simple evolution of regional markets for CO₂e credits.

CAFÉ had two different aims:

- Calculation of the carbon balance. In particular the tool allows to evaluate and to assess the current carbon budget of the farms, in the selected fields (farm patches) chosen by farmers wishing to participate to GECO2 who meet the basic conditions required by the project;

Definition of CO₂e credits per farm field, and per hectare. Each credit is calculated in tons of equivalent carbon dioxide sequestered. These credits will be registered in the GECO2 database. A specific offset registry is a part of this database. The registry is a system for reporting and

tracking offset project information including project status, project documents, credits generated, ownership, sale, and retirement.

The Calculator use, as information base for the calculation, data collected through specific questionnaires published online. Data entered were based on an in-field evaluation made by Geco2 technicians.

COFFEE (Carbon OFFsetting Emission Elaborator)

COFFEE allows the definition and the assessment of global energy emissions, and in particular the quantity of GHG emissions that credits buyer, in the absence of a carbon footprint, can offset.

COFFEE is a tool that estimates buyer's carbon footprint.

It registers buyers' data and their carbon footprint (for selected activities and /or production of goods and services). The calculation can be linked to the selected activities to be offset, in compliance with marketing choices made by the buyers.

In that regard, two reference guides, assisting actors on compilation of both tools, have been prepared.

MAP – Market Platform

Furthermore, GECO2, with the aim to ease the matchmaking process of CO₂e credits, has created an ad hoc project web-based database ([MAP – Market Platform](#)) where it is possible:

- To upload calculated credits
- To insert purchase options made by buyers
- To create firms and credits register and its continuous updating
- To monitor credit transactions

- To cancel credits, after the conclusion of transactions.

It is a “locally based” CO₂e voluntary credits exchanging platform that guarantees the needed flexibility of regional markets.

By recording market transactions and guaranteeing the withdrawal of sold credits, MAP acts as a public registry and ensures the traceability and transparency of transactions.

Seminars and training modules on project topics and tools have been organized in the seven partner regions throughout the life of the project.

Courses were targeted at:

- - Staff and external consultants of the partners
- - Farmers
- - Companies in the industrial and service sectors
- - Public administrations and citizens.

42 Seminars and training sessions on project topics and tools organised in the seven partner regions (18 in the preliminary phase and 24 in the pilot phase)

Furthermore, the project developed also some important communication activities:

- Educational materials and gadgets;
- Articles published in newspapers sectoral and scientific journals;
- Videos and Interviews published on websites and on TV ;
- Participation in events (Ecomondo, Macfrut e BIM world -Solutions bas-carbon)
- Video animation (winning the prize "Europe is here" as the best promotional tool)
- An hoc logo, available for communication purposes to all the project actors.

All the technical training and information activities have been important to guarantee awareness of project actors and quality on results.

During the pilot phase of GECO2 more than 350 farmers have been contacted and 160 farms¹ have been selected to participate.

Number of agricultural companies per region:

- 32 Emilia-Romagna (Romagna area)
- 23 Puglia
- 7 Molise
- 21 Marche
- 24 Dubrovnik
- 34 Zara
- 19 Split

The total amount of experimental fields was of 204 with a total of 1877 hectares.

2,4-ton of CO₂e /hectare has been the average CO₂e sinking value per hectare with a total of about 4500-ton CO₂e sequestered by the project.

The farmers have adopted an average of 6,5 over 10 of the practises

¹ Farms that meet the eligibility criteria established by the project and whose credits have been calculated

selected by the project.

Main agricultural practices registered in the 204 experimental fields:

seizure from re-use of green residues	185
seizure from reuse of wood waste	157
organic soil improvers	154
conservation land seizure	140
preservation seizure	90
crop cover seizure	88

Other key points have been communication and training that have raised actors and PAs interests and knowledge about the GECO2 carbon market.

Lessons learned and challenges

The experience developed by GECO2 showed that organizing a voluntary CO₂e credits regional market in agriculture is possible.

GECO2 has received a great deal of appreciation and interest. FAO, the DG Climate and DG Agriculture of European Union, the Italian Ministry of Agriculture and the Croatian Ministry of Agriculture, all the regional governments involved, have expressed their attention all along the lifespan of GECO2 for the activities and operational tools developed by the project.

Regional Carbon Markets, like that developed by GECO2, appear in fact, perfectly in line with recent European development strategies and policies.

The development of a sustainable food system also brings new opportunities for operators in the food value chain and the coherence with EU “farm to fork” strategies is crucial.

From now on, exploiting the results and the tools of the project, each regional PA can develop and manage a local CO₂e credits market.

Such a kind of local carbon market will enable PAs to pursue the following objectives:

- a) to benefit all the community with real, measurable, long-term, and sustainable actions.
- b) to contribute to mitigate climate change.
- c) to support virtuous farmers and buyers on implementing practices enable to cut emissions and maximize CO₂e sinking it in soil and biomass.
- d) to contribute to a Regional Food Policy (see glossary) to improve the operation of the food and agriculture system balanced with ensuring sustainability, human health needs, mitigate and reduce risk of climate changes.
- e) to introduce new innovating items activities and tools related to a regional carbon market

PAs can develop a voluntary regional carbon market and to create a set of actions in which farmers can act. This strategy allows to create an ecosystem service payment, forming a circular economy scheme from the buyers to the farmers. The platform (database) can also be exploited as an observatory not only for the CO₂e credits market but as a monitoring system of carbon removals and emissions.

In synergy with the Farm to Fork Strategy aims, a local voluntary market contributes to accelerate our transition to a sustainable food system and reach the following objectives:

- have a neutral or positive environmental impact reducing carbon emission and maximizing CO₂e sequestration capacity.
- help to mitigate climate change and adapt to its impacts.
- reverse the loss of biodiversity.
- ensure food security, nutrition and public health, making sure that everyone has access to sufficient, safe, nutritious, sustainable food.
- reduce water consumption and geomorphological risks and increase farm resistance to drought.
- preserve affordability of food while generating fairer economic returns, fostering competitiveness of the EU supply sector and promoting fair trade.

If they are not sustainable, regional food systems cannot be resilient to crises as shown by the COVID-19 pandemic. Regional environment goals can be achieved only through a new strategy. European Food systems today account for nearly one-third of global GHG emissions, consume large amounts of natural resources, result in biodiversity loss and negative health impacts (due to both under- and over-nutrition) and do not allow fair economic returns and livelihoods for all actors, especially for farmers. Moving food systems along a sustainable path, introducing regional voluntary markets, also brings new opportunities for operators in the food value chain. New production systems, technologies, and scientific discoveries, combined with increasing public awareness and demand for sustainable food, will benefit all stakeholders, as GECO2 regional carbon model, already proved.

In this framework, it is important to highlight some topics derived from GECO2 experience:

- Communication and training are key elements on developing innovative strategies.

The GECO2 positive impact had with all the actors, has eased the participation of farmers and buyers to the project increasing public and private awareness concerning project environmental themes.

The pilot phase of the project showed that information, direct relationship, and training are important to reach farmers, companies, PAs.

Capacity building actions can be important and organizing meeting and training from qualified technical advisers make sure that all the actors take the opportunity to learn new skills. This may save on future costs and increase local engagement and ownership of the carbon farming projects, buyers voluntary actions, carbon transactions.

- Market characterized by reliable, low cost and simple structure

Despite the technical regulatory cultural obstacles encountered by the project during its life, the results achieved encourage actors and stakeholders to give continuity and development to this experience.

The access by sellers and buyers to the portal, where the absorptions and credits are presented, has allowed to have the transparency necessary to create reliability in the participants, to continue the project.

The pilot market developed by GECO2 tested the feasibility and replicability of this kind of market.

- Self-sustained costs and economic advantages

The project assessed the regional costs to operate a voluntary market in terms of technical costs (training and information to farmers and purchasers, data loading and reliability control, evaluation and LCA acquisition of purchasers and data undertakings), IT and control costs, administrative costs.

Management and the cost of the market could be borne by public, national and regional administrations, or be fully or partially supported by withholding up to 10% from transactions.

As a general reference, taking 7.4 tons per EU inhabitant per year,² it can be estimated that a standard voluntary regional market allows to absorb the emissions of about 81000 European inhabitants each year.

The calculation system for agricultural uptake is tested on tree crops but also works with herbaceous crops.

With an average absorption of 2,5 tons of CO₂e seized per hectare (the one recorded by the project) and considering a potential value of 50/80 € per ton, it can be estimated an additional income per farmer of 125/200 € per hectare per year. Furthermore, the growth in soil organic matter and the practices used to increase the carbon uptake in the agricultural ecological system, reduce erosion and failure processes and increase water absorption capacity, contributing to significant savings in land conservation and maintenance public and private costs.

In fact, the new farm management scheme adopted by GECO2 selected farmers participating to the market, has increased their CO₂e absorption capacity, having as a side effect that of mitigating geomorphological and hydrogeological risks and preventing soil erosion (with windthrow risks that would result in additional CO₂ emissions).

Furthermore, local carbon markets, through actions aimed to favor the involvement of the carbon credits buyers are aimed not only at measuring the carbon footprint, and therefore at increasing awareness on emitters, but to create a regional system of improvement actions in CO₂ emissions and energy consumption reduction.

² source: <https://ambientenonsolo.com/le-emissioni-di-gas-serra-da-parte-dei-paesi-europei/>

Further elements to be developed

The tools, calculators and databases are usable and already tested.

Nevertheless, the project tools could be further developed considering the whole farm, including annual crops, databases of carbon credit markets to be connected to the annual evaluation of credits, a better connection with the farm handbook, etc.

Another evolution could be to integrate the GIS into the instruments.

MAP platform can be developed both strengthening its role in building a regional observatory measuring and controlling CO₂ emissions and absorptions and supervising a future locally based CO₂e voluntary market.

The database model could be further developed adding connections with PAs, increasing management functions and interconnections with calculators.