info@carbonpro.org
www.carbonpro.org

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carbon balance drafting and new resources management tools according to kyoto protocol

PROJECT COFINANCED
BY ERDF WITHIN
THE INTERREG III B
CADSES PROGRAMME

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The Kyoto Protocol

The United Nations Framework Convention on Climate Change (hereinafter referred to as UNFCCC) signed in 1992 declared that climate change is a genuine threat for humanity. Among the causes of climate change, the progressive increase of greenhouse gases (GHG) is considered one of the most important. It was therefore decided on one hand to promote actions aimed at reducing production of GHGs and, on the other, to support activities aimed at fixing gases in organic compounds such as vegetal biomass.
The UNFCCC therefore invited the subscribing countries to develop actions and strategies to conserve and improve natural ecosystems, with the aim of encouraging carbon stocking.

As part of the UNFCCC, the Kyoto Protocol was adopted in Kyoto, Japan, on 11 December 1997 and entered into force on 16 February 2005, following Russia's ratification in November 2004. By October 2006, 166 countries and other governmental bodies, accounting for more than 61.6% of emissions from developed and industrialized countries, had ratified the Agreement.

Countries that ratify this Protocol undertake to reduce their emissions of carbon dioxide and five other GHGs by 5% compared with the 1990 level during the First Commitment Period (2008-2012).

Countries will have a certain degree of flexibility in how they make and measure their emission reductions. The measures to control and reduce GHG emissions are accompanied by other strictly forestry and agricultural management activities able to contribute to achieving the Kyoto objectives.

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The role of forest and agricultural ecosystems

Forests are acknowledged to play a fundamental role in the biogeochemical carbon cycle, acting as "sinks" in which the molecules are fixed (as the CO_2 used for the photosynthesis process) and stored in the form of organic matter (wood and other parts of the plants). The effects deriving from the presence of forests vary according to their age and the way in which they are managed. The type and ecological characteristics of the forests are also important.

There are two kinds of effects:

Direct effects	associated with the absorption of atmospheric carbon dioxide and its storage in the biomass for periods of different lengths depending on use of the biomass (firewood, manufactured timber, etc.)
Indirect effects	associated with the energetic use of biomass as a substitute for fossil fuels, avoiding the release of further greenhouse gases into the atmosphere

Studies have demonstrated that, as well as forest systems, **agricultural ecosystems** also play quite a significant role in the carbon cycle.
The choice of cultivation techniques can heavily affect the system's capability of fixing carbon dioxide and, more in general, of retaining carbon. Examples of actions that can affect the total carbon balance are: energetic use, minimal cultivation or non-cultivation of land (reducing mineralisation of organic matter and release of CO_2), the preservation of residual crops on the soil, use of natural organic fertilizers and use of part of croplands to plant hedges or woods.

As a consequence, activities such as planting trees on marginal land, restoration of degraded soils and adoption of best practices that could improve water and soil quality and protect habitats are recognized within the Protocol.
For the same reason, natural resource management policies at all levels should always take the role played by agricultural and forest resources in absorbing and retaining carbon into consideration.

Two articles of the Kyoto Protocol refer in particular to the forest sector in order to calculate the effects of land management on the national carbon balance since 1990, adopted as the reference year.

- Article 3.3 permits industrialized countries to take into account the greenhouse gas effect of "direct human-induced activities" such as afforestation, reforestation and deforestation;
- Article 3.4 permits them to consider the effect of additional land-use measures such as forest management, cropland management, grassland management and revegetation.

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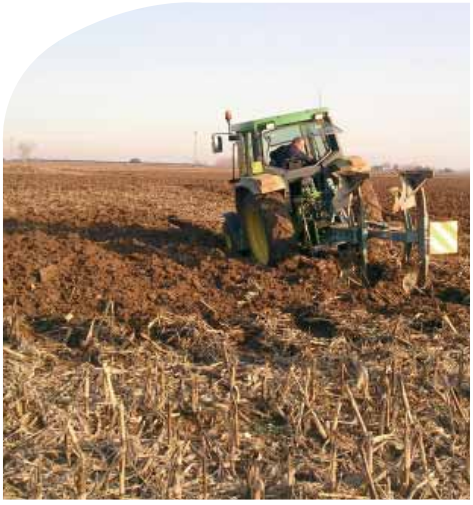
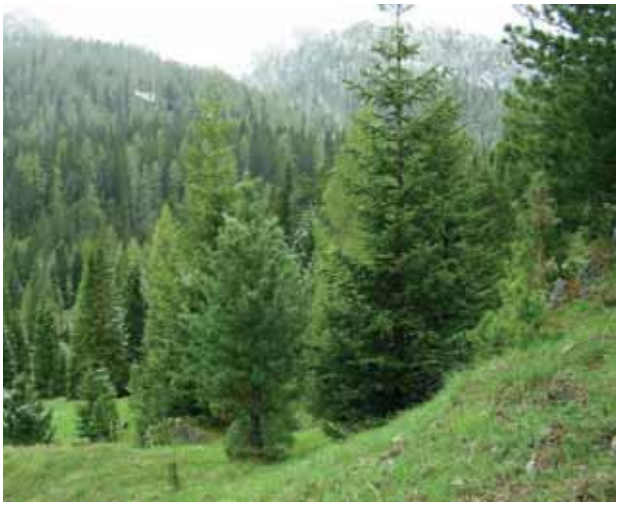
The Marrakech accords and IPCC procedures

The Marrakech Accords signed in 2001 invite the Intergovernmental Panel on Climate Change (IPCC) to elaborate assessments, measures and methods to quantify and monitor changes relating to the use of sinks and land-use.
The Accords involve, among other things, definition of the forest and agricultural activities relevant to the Kyoto Protocol and of methods for calculating their effectiveness in limiting carbon emissions.





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The project background

The Carbon Pro project aims to develop various joint strategies for implementation of the Kyoto Protocol, in particular involving forest and agricultural resource management.
At present, the research groups working on these themes have gone down different paths in the scientific debate on the Kyoto Protocol and carbon balance.
The IPCC standards for quantifying carbon sinking immediately appeared insufficiently wide-ranging to include all the elements and factors involved in the carbon balance.
So alternative more detailed models were developed enabling the effects on carbon stocking of different forestry and agricultural practices to be calculated.
The wide range of possible solutions identified by the researchers made it necessary to compare the proposed models in order to evaluate their efficiency and applicability and develop, through simulations, detailed analyses of the future effects of the strategies adopted.
From this point of view, the project area, which includes 6 CADSES countries, is a very interesting territory considering the large number of vegetation types present and the models set up by the researchers involved in the project.
Carbon Pro is not a research project aimed at creating new knowledge, but an initiative in which the solutions chosen by the research groups will be shared, integrated and proposed to the public administrations responsible for land planning.

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The project objectives

The general objective of CARBON-PRO is to **share integrated methods, systems and tools for the sustainable management of agricultural and forest resources in the CADSES area. Thanks to the results, the CADSES public partners will be able to take their fundamental function in absorbing and retaining carbon into account. They will therefore be able to improve existing environmental policies, in compliance with the commitments undertaken by countries subscribing to the Kyoto Protocol.**

The **specific objectives** of Carbon Pro are:

- To identify management methods and practices for the sustainable use of forests and agricultural land, able to strengthen their capability of absorbing greenhouse gases;
- To analyse the economic consequences deriving from changes in managing agricultural and forest resources aimed at improving the carbon retention capability;
- To pinpoint specific tools aimed at implementing the Convention on Climate Change and Kyoto Protocol in agricultural and forest resource management policies;
- To provide concrete applications to achieve the objectives of multi-functionality and agricultural and environmental protection established by the new Common European Agricultural Policy.

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The project activities

Project activities are conducted within the CADSES area in specific territorial contexts in Austria, Croatia, Germany, Greece, Hungary, Italy and Slovenia. Actions were identified by all partners during the preliminary activities of the project.
Achievement of the project objectives involves the following activities, organised into *Work Packages* (WP) and relevant outputs.

WP 1. Identification of cross-border territorial areas and carbon balance models

The first step of the project consists, on one hand, of choosing the areas which each partner will monitor intensively in order to collect the carbon balance data and, on the other, to identify carbon balance analysis models.
The territories selected are representative of many vegetation types in the CADSES area and fall within the categories of:

- mountain forests, represented by natural forests and Alpine forests similar to natural forests;
- agricultural and agroforestry land and lowland forests;
- Mediterranean forests;
- fast growing forests in agricultural areas (for example, poplar plantations).

The carbon balance models chosen by the partners are:

- CO_2 Fix (Italy: Friuli Venezia Giulia Region, Germany and Croatia)
- Biome BGC (Italy: Friuli Venezia Giulia and Hungary)
- Gotilwa+ (Slovenia)
- Roth C (Italy: Friuli Venezia Giulia)
- WBE (Italy: Veneto Region)
- Gorcam (Austria)

WP 2. Field measurements

The field measurements are required to develop a data set to feed the models identified in the previous WP1. To achieve this, after choosing the model and identifying existing data, each partner collects further data by direct field measurements using inventory or eddy covariance methods.
The measured data are collected in a database.

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WP 3. Carbon cycle evaluation

The models selected in WP1 to quantify CO_2 fixing will be applied to the main agricultural and forestry systems. This will enable the sinking capabilities of each system to be determined according to the different management methods and simulations to be performed to evaluate the effects of the management methods on GHG fixing. Public administrations will be provided with practical tools to plan forest and agricultural resource management with the aim of maximising carbon sinking.

WP 4. Local application of management strategies coherent with the Kyoto Protocol

The results obtained in the previous WP3 will be structured for use in the production of territorial planning documents and will be applied to pilot actions.

As part of the project, "local centres" are created with the aim of keeping the public administrations and research centres in constant contact.

At transnational level, Carbon-Pro promotes the First International Governance Conference on integrated policies aimed at co-ordinating and integrating environmental and land planning policies along the lines of the Kyoto Protocol with the involvement of the main local-regional-national decision makers in the whole area. Carbon Pro also promotes its opening to other EU and non-EU countries in order to share experiences, lessons learned, practices, future steps, responsibility awareness, etc.

WP 5. Dissemination and exploitation of the results

A Mainstreaming Action Plan (MAP) identifies the tools foreseen by the project for the dissemination of information useful during implementation of the Kyoto Protocol principles to parties outside the partnership including stakeholders in the countries taking part in the project, CADSES countries, EU countries and candidate countries. At the end of the project, a Results Exploitation Action Plan will be drawn up in order to identify the strategies for optimum valorisation.

Carbon Pro provides users with a project Website and a Community of Practices that collects data, information, opinions, documents and materials on carbon balance experiences, full carbon accounting procedures and carbon credits management.

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Main project dissemination tools

Dissemination tools	Contents	Available from:
Project website www.carbonpro.org	- project materials - results - activities - document section This tool also contains general documents about the Kyoto Protocol and carbon balance.	November 2006 (periodically updated)
Newsletters	5 groups of newsletter about project activities: 1st number: Presentation of Carbon Pro, website and newsletter 2nd number: direct field measurements 3rd number: research centres 4th number: results of data processing and presentation of local working board 5th number: presentation of the project results Subscription is possible on www.carbonpro.org	From January 2007 to December 2007
Field activities leaflet	Description of the field measurements to be made by partners (in all partners' languages)	March 2007
Local working boards	In each country, 1-2 meetings among local stakeholders to raise awareness about the local situation	Between February 2007 and September 2007
Publications on technical reviews	2 publications about transnational models and experiments on the models	July and September 2007
Common Transnational Guidelines	- on how to match models - for an integrated approach to the carbon cycle - for pilot actions	- January 2007 - March 2007 - September 2007
Transnational Action Plan	A document about common strategies for decision makers for the management of agricultural and forestry resources to oppose the increase in GHGs	September 2007
1st International Integrated Governance Conference	A meeting concerning policy integration, aimed at coordinating environmental planning strategies and involving the main decision makers in the CADSES area	September 2007

Contacts

For more information and contact: **www.carbonpro.org**
info@carbonpro.org

Country	Partner	Department involved	Responsible
Italy	Regione Autonoma Friuli Venezia Giulia *Autonomous Region of Friuli Venezia Giulia* Lead Partner	Central Directorate for Agricultural, Natural, Forest and Mountain Resources – Service for Forestry Management and Fire fighting	**Emilio Gottardo**
Italy	Regione del Veneto *Region of Veneto*	Directorate for Forestry and the Mountain Economy	**Maurizio Dissegna**
Italy	Università degli Studi di Udine University of Udine	Department of Agriculture and Environmental Sciences	**Giuseppe Zerbi** **Alessandro Peressotti**
Hungary	Országos Meteorológiai Szolgálat *Hungarian Meteorological Service*	Department for Analysis of the Atmospheric Environment	**László Haszpra**
Germany	Technische Universität München *Munich Technical University*	Institute of Silviculture	**Michael Weber**
Slovenia	Gozdarski Inštitut Slovenije *Slovenian Forestry Institute*	Forest Ecology Department	**Primož Simončič**
Austria	CERE - Center of Excellence for Renewable Energy, Energy Efficiency and Environment	KWI Consultants & Engineers	**Martin Reckmann**
Greece	Municipality of Thessaloniki		**Kyriaki Kornaraki** **Marinidis Kostantinos**
Croatia	Šumarski Institut Jastrebarsko *Forest Research Institute Jastrebarsko*	Department for Forest Management and Forestry Economics	**Dijana Vuletić**
Bosnia - Herzegovina (associated partner)	University of Banja Luka	Šumarski fakultet	**Milan Mataruga**
Technical Secretariat	Informest	Service and Documentation Centre for International Economic Co-operation	**Sandra Sodini**
Scientific Secretaria	Euris	Euris Life	**Luca Ferrarese** **Lucia Brusegan** **Giulio Volpi**

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REGIONE AUTONOMA FRIULI VENEZIA GIULIA

REGIONE DEL VENETO

Università degli Studi di Udine

Országos Meteorológiai Szolgálat

TECHNISCHE UNIVERSITÄT MÜNCHEN

Gozdarski Inštitut Slovenije

CERE - Center of Excellence for Renewable Energy, Energy Efficiency and Environment

Municipality of Thessaloniki

Šumarski institut, Jastrebarsko

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info@carbonpro.org
www.carbonpro.org