SITUATIONAL ANALYSIS

on natured-based Carbon Offsets

Catalogue of Good Practices
&
Mapping of Carbon sinks

Regione Marche (Italy)]
2023

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1. Introduction

[Here LP will introduce the NACAO project, its objectives, activities, methodology to exchange GPs, learning process, etc.]

Climate change is one of the greatest challenges requiring urgent policy action. The climate crisis is dire. We pollute a lot. We have known that for a long time. What is new is that we are increasingly putting up resources: firstly, reducing emissions, individually and collectively; and, secondly, offsetting them by investing in clean projects.

The compensation of GHG emissions is, in general, a topic underdeveloped by the public administration and, when developed, very limited and traditional measures are entered into force.

In this sense, NACAO (Nature-based Carbon Offsets) project aims at being an accelerator for regional governments with competencies on climate change throughout Europe actively approaching the offsetting of carbon emissions, in this case by developing nature-based solutions and policies contributing to the offsetting of emissions through them.

During the project, regional governments with competencies on environment and climate change from the Northern, Southern, Eastern and Western of Europe will share green and blue carbon solutions and police in force aiming at the preservation, restoration and improvement of natural sites acting as carbon sinks, such as forests, wetlands and other ecosystems, that compensate GHS emissions. Also, their experiences on carbon credits and emissions markets related to nature-based solutions.

The ultimate aim is for the partners to increase their knowledge and capacity to implement in their regions green and blue carbon initiatives and polices learned during the cooperation, regions thus contributing to the mitigation and adaptation to climate change.

The project brings together 6 partners from 6 countries (Spain, Italy, Poland, France, Finland and Germany) to improve their policy instruments addressed so that they develop the compensation of GHG emissions through the use of nature-based interventions.

Object and scope of Situational Studies

The aim is gathering all the good practices and experiences (success and unsuccessful) developed in the field that will be shared as well as mapping the green and blue carbon sinks in the regions where the lessons learnt during the cooperation could be applied.

2. Regional context

Marche hosts a variety of landscapes and environments that has produced, in centuries, a society and an economy strictly connected to territory, made by small historical towns, traditional agriculture, tourism, fisheries and small and medium enterprises. Consequently, climate change, with its effects and its consequences is strictly related to social and economic issues.
The regional policies on climate change, hence, are integrated in the sectorial policies, as land management, forestry, agriculture, energy and so on.
The integration of climate change issues in rural development policy is one of the main objectives of the common agricultural policy (CAP, COM(2017)0713): the regional complement for rural development of the national CAP strategic plan contains actions and investments for climate mitigation and adaptation. The specific objective 4 aims to contribute to climate change mitigation and adaptation, reducing greenhouse gas emissions and improving carbon sequestration, as well as promote sustainable energy.

The regional economic and social sectors are addressed by the Operational Programme of the European Regional Development Fund 2021-2027 (ERDF PR) which aims promoting the sustainability of investments and contributing to the achievement of Europe 2030 Strategy and the objectives of the European Green Deal, which at local level are set out in the Regional Strategy for Sustainable Development. In particular, the specific objectives 2.4 aims to promote climate change adaptation, disaster risk prevention disaster risk and resilience, taking into account ecosystem-based approaches. The implementation of this Specific Objective could be improved taking in to account the application of green solution.

The integration of climate change adaptation and mitigation is also a focus of the ITACA protocol at Urban scale.
Starting from a set of basic assessment items, the ITACA Protocol Urban Scale aims to provide a final performance score, indicative of the sustainability level of the urban settlement. The constituent elements of the evaluation method can be summarized as follows:
- a set of evaluation items, called criteria;
- a set of quantities, called indicators, which allow to quantify the performance of the urban area in relation to each criteria. The criteria were distributed in a series of thematic areas that try to define the complexity of urban quality; governance; urban morphology; landscape integration; quality of the design (bld./site); public spaces; urban metabolism; biodiversity; adaptation; mobility / accessibility; social and functional diversity; economic-social effects.
The objective of this protocol, which will act in synergy with other protocols relating to building sustainability and facilitate appropriate responses to urban regeneration, is to provide a cross-scale assessment that will measure the sustainability level of interventions in urban environments ranging in size from the block to the city. This

protocol will be useful for public planning bodies and all those stakeholders in developing or transforming urban areas. In order to implement its use also in support of financing programs at national level for urban regeneration, the Protocol has been simplified with the elaboration of a synthetic version.

3. Regulatory and Policy framework for Climate Change

The main instrument for the national policy on climate is the Integrated National Plan on Energy and Climate (PNIEC), prepared in cooperation by the three Ministries of Energy, of Environment and of Transport. The Plan is mainly focused on energy issue. Even if the carbon absorption is addressed, there is no specific reference to green or blue solutions. In line with the PNIEC, Marche is currently drafting the Regional Plan of Energy and Climate, focused on promoting energy efficiency and renewable energy.

The Marche Region has identified the need to address climate change adaptation and mitigation within the scope of its sustainable development policies, which pursue the goal of improving the economic, social and environmental well-being of its citizens by 2030. The Regional Sustainable Development Strategy (SRSvS), adopted in December 2021, acknowledged the global climate change and local impacts affecting the regional territory. The main climate impacts affecting the regional territory are those related to rising temperatures, changing precipitation, changes in mean sea level, and the increased frequency and intensity of extreme events (such as heat waves, flash floods, droughts, and wildfires). All these phenomena increase the vulnerability of the Marche region and interact with social and economic factors, exacerbating its vulnerability and making climate change action increasingly central and urgent.
Following the commitments of the SRSvS, in April 2023 was adopted by the regional administration a draft of the Regional Climate Change Adaptation Plan (PRACC) for public consultation and the Strategic Environmental Assessment (SEA) procedure. The PRACC contains also meausres on green solution that combine adaptation with mitigation (carbon sink). The PRACC is in line with indication of the draft National Plan for adaptation to climate change, currently under approval.

Even if in last years Marche is enhancing its efforts on climate change mitigation and adaptation policies, an overall regulatory framework on carbon sequestration and market is still missing.

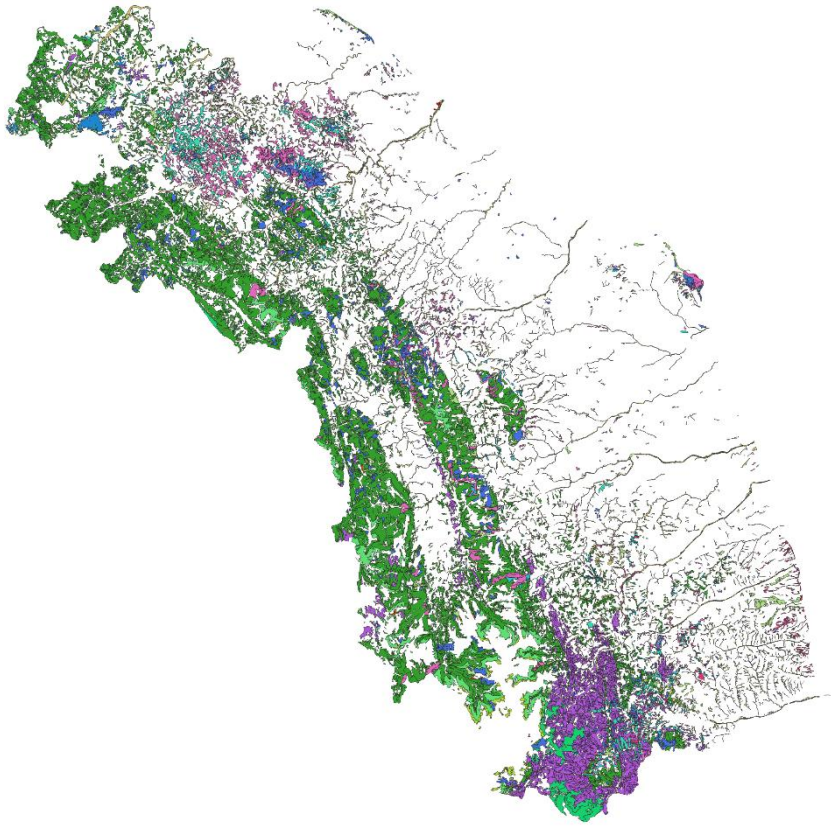
4. Catalogue of Good Practices on nature-based Carbon Offsets

Title of the Good Practice *[100 character]*	**Type of Good Practice** *[drop down]*	**Brief description of the Good Practice** *[500 character]*	**Source of Carbon Offsets** *[drop down]*	**Promoting institution level** *[drop down]*	**Level of Application** *[drop down]*	**Geographical scope** *[insert location]*	**Status** *[drop down]*
The Compensative Ecological Evaluation (VEC)	Administrative	The VEC is a method bases on an algorithm that computes 1) the ecological value of natural areas 2) the intensity of the damage in respect to the initial conditions, 3) the extention of natural surface that have to be restored (compensation) to mantain the initial ecological value.	Green Carbon	Regional	Local	Various location	On-going (in progress)
The green roof of the Marche Region's Leopardi Palace	Other: Pilot	Green roofs and roof gardens contribute to reducing the impact of heat waves through water and vegetation: cooling by evaporation causes a lower temperature. This reduces radiant heat transfer and cooling requirements. These technology approaches reduce cooling requirements and improve thermal comfort in summer. They can also influence outdoor temperature at the urban scale, not just at the building level.	Green Carbon	Regional	Local	Ancona	Successfull
The ITACA protocol at Urban Scale	Administrative	Starting from a set of basic assessment items, the ITACA Protocol Urban Scale aims to provide a final performance score, indicative of the sustainability level of the urban settlement. The objective of this protocol is to provide a cross-scale	Green Carbon	National	Local	Various location	Successfull

		assessment that will measure the sustainability level of interventions in urban environments ranging in size from the block to the city.					
"Forest Compensation Plan" of Autostrade per l'Italia s.p.a.	Technical	The Plan projects the realization of over 420 of forest as compensation of the adverse effects coming from the enlargement of A14 motorway in the Marche territory. The plan was drafted in agreement between the National Environmental Ministry, Marche Region and the Society responsible for national motorways (Autostrade per l'Italia s.p.a.) and its implementation is under the responsability of Autostrade per l'Italia s.p.a.	Green Carbon	National	Regional	Various location	On-going (in progress)
CO2 S.Fo.Ma. Marche - CO2 Stored in Forests Management Marche	Administrative	The project promotes conservation and carbon sequestration in the forestry sector. The partnership, has pursued Sustainable Forest Management (GFS) of the forest assets (with a voluntary certification recognized by accredited third-party certification bodies) and has identified a methodology consisting of counting the stored carbon and evaluating the sustainability credits that can be generated by specific forest management and agroforestry sinks in the area.	Green Carbon	Regional	Regional	Various location	Successfull

5. Mapping of Carbon sinks

Natural and semi-natural ecosystems, and in particular forests represent the main carbon sink for Marche region. The work of Giove et al. (2008) has estimated the fixative capacity (sink) of woods in Marche between 246,000 and 282,000 tons/year of C, corresponding to over 967,000 t of CO^2. Nevertheless, form an ecological and territorial point of view, the possibility of further expansion of forest is very limited.



Woods and bushes in Marche region (elaboration from "REM – Valenza geobotanica 50k")

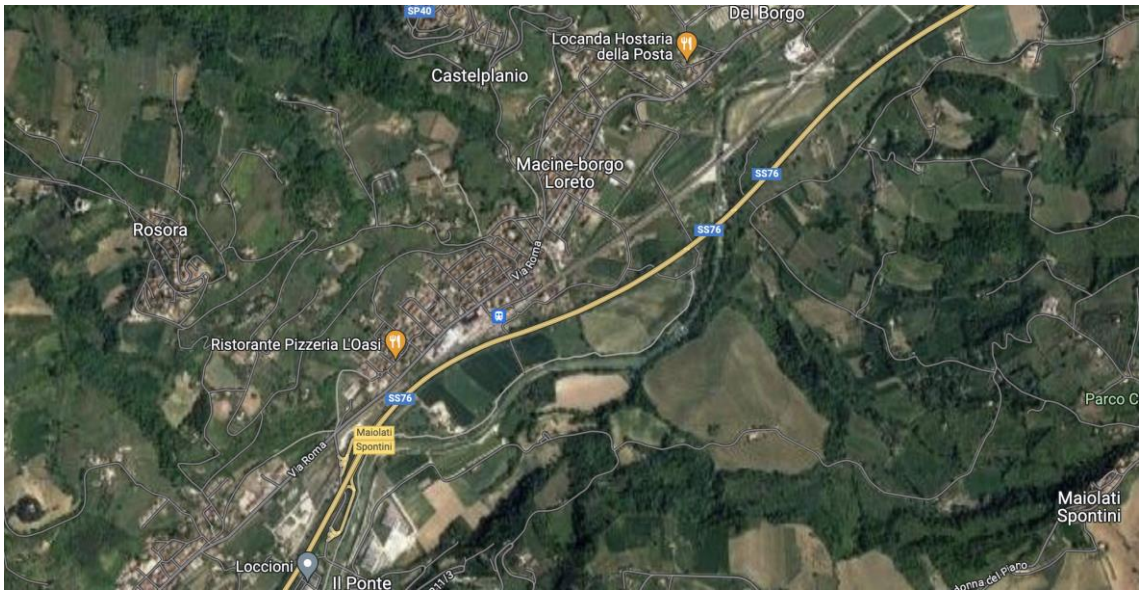
An experience in this sense was represented by the "Forest Compensation Plan" implemented in agreement between the National Environmental Ministry, Marche Region and the Society responsible for national motorways (Autostrade per l'Italia s.p.a.), to compensate the adverse effects coming from the enlargement of A14 motorway in the Marche territory. The plan included several forestation projects aimed to compensate in terms of carbon absorption the realization of the infrastructure. The plan has initially settled an amount of over 420 ha of new forests, but the availability of land for the realization of woods has allowed, till now, to project and to realize new forest only in 75 ha (corresponding to a CO2 sink in 5 year of about 1995 tons).

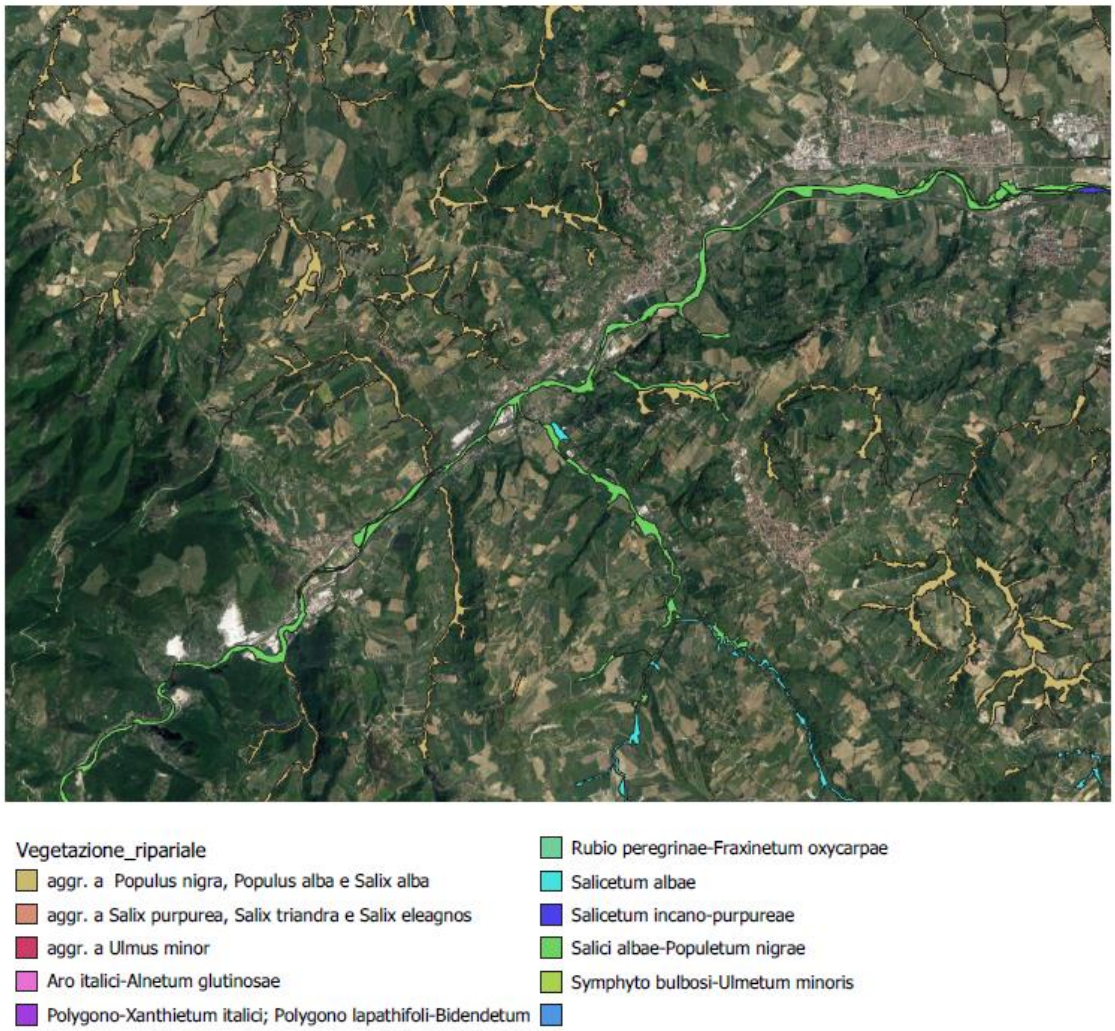
On the other hand, in past years the surface of riparian woods suffers for a general depletion (in terms of both extension and ecological status), as consequences of land management (especially agriculture) and intervention finalised to hydrological security. Marche currently hosts a surface of over 24.198 ha of riparian woods, with a great potential for implementation.

The potential of riparian wood as carbon sink is very high but need the synergy between mitigation policies (green solution) and ecological services, in an integrated approach for land management.

In this sense, Marche Region has activated a collaboration with the University Politecnica of Marche (DGR 1386/2023), to study the potential on riparian ecosystem as carbon sink.

The study is applied to a pilot area, representative of both natural and damaged biotopes along the Esino River. This analysis allows understanding the potentiality of carbon sink in similar context of the Region and can be used to estimate the carbon sink potential for riparian ecosystems over the whole Region. The area chosen is also suitable for the implementation of a pilot project that combine the realization of natural ecosystems (riparian wood, wetland, …) with the reduction of risk of floods.





With a volume of 157,3 m3/ha and a basal density of 0.54, riparian woods stock 59,46 tC/ha. Considering the total extension of riparian wood in Marche region, the total carbon stock corresponds to 1,4 MtC (5.2 Mt CO2).

Type of Area *[drop down]*	**Location** *[drop down]*	**Type of project** *[drop down]*	**Source of Carbon** *[drop down]*	**Main characteristics of the Carbon sinks** *[500 character]*	**Status** *[drop down]*	**Tn CO_2 captured or emitted by the sink** *[optional]*
Other area_____ *woods and forests*	Other location *(varous location)*	Forests	Other, not limited to nature-based Carbon Offsets_____ motorway construction	Realization of compensation project in line with the "Forest Compensation Plan" of Autostrade per l'Italia	In explotation	1955 tons in 5 years
Other area_____ *riparian woods*	Other location *(varous location)*	Forests	Green Carbon	Overal surface of riparian woods in Marche region	In explotation	5,28 MtCO2 (stock)

6. Conclusions

Climate change is one of the greatest challenges that requires urgent political action. In the face of an increasingly evident climate crisis, it is necessary to deploy increasingly effective resources and tools. In addition to reducing climate-altering gases emissions, Marche Region is intensificating its efforts on increasing the absorption capacity of agricultural, forestry and natural systems.

The compensation of greenhouse gas emissions is, in general, a topic that has not been developed enough by public administrations but is becoming increasingly important.

The Marche Region has already started a process that includes, among the actions aimed at mitigating climate-altering gases, also actions aimed at increasing carbon capture by natural and semi-natural systems (green and blue carbon). In light of the various initiatives already undertaken, the need is to outline the path to follow to reach a structured system that facilitates the implementation of nature-based solutions for carbon absorption (green and blue carbon). With Act of regional Council n. 808 of 27/05/2024 was approved by the Marche Regional administration the “Roadmap for the activation of nature-based policies for greenhouse gasses reduction (blue and green carbon)”.

In approaching to this situational analysis, it was chosen to introduce the overall regional situation of Marche Region. Instead of presenting single examples of green carbon, the current state of carbon sink, and large-scale interventions on green carbon are reported here. This has evidenced that the potential for further increment in carbon sink is limited to specific ecosystems. Therefore, a first analysis of the potential for carbon sink from riparian wood was introduced. Considering the configuration of the Marche’s territory, the ecosystem associated to riparian wood present the best option to develop further regional policies for green carbon.

7. Bibliographic references

Giove, M., Gambini, M., Renzaglia, F., & URBINATI, C. (2008). Prime stime sulla capacità di stock di carbonio nei boschi delle Marche. *Atti del Convegno “Quale futuro per il bosco dell’Appennino*.