

MRV4SOC

Monitoraggio, Reporting, e Verifica del Bilancio del Carbonio e dei Gas Serra

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Innovation Center Giulio Natta, 27010
Giussago (PV)



Universidade de Vigo



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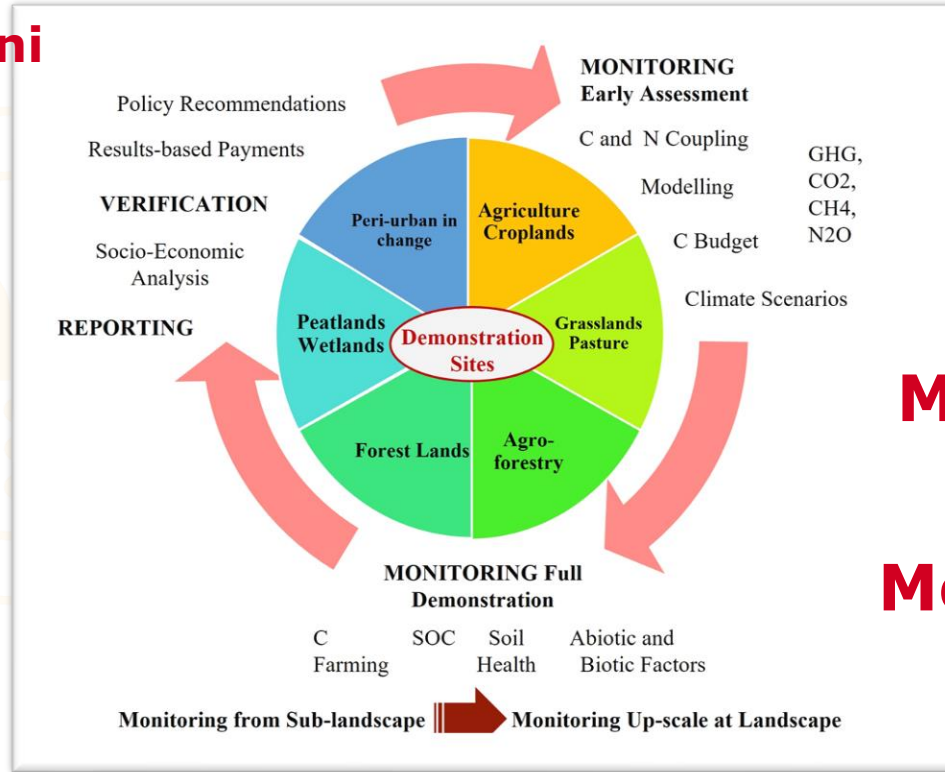
Il concetto di MRV4SOC

Reg. Europeo Certificazione dei crediti di carbonio

Raccomandazioni politiche

Reporting nazionale

Analisi socio economica



Carbon farming

Monitoraggio

Modellistica

Contesto

Cosa sono le rimozioni di carbonio e il Carbon Farming?

Pratiche agricole e strategie di uso del suolo sostenibili:

- sequestrare il biossido di carbonio (CO₂) atmosferico nel suolo e nella biomassa delle piante
- ridurre le emissioni di gas serra
- mitigare i cambiamenti climatici
- garantire servizi ecosistemici come la riduzione dell'inquinamento e l'aumento della biodiversità

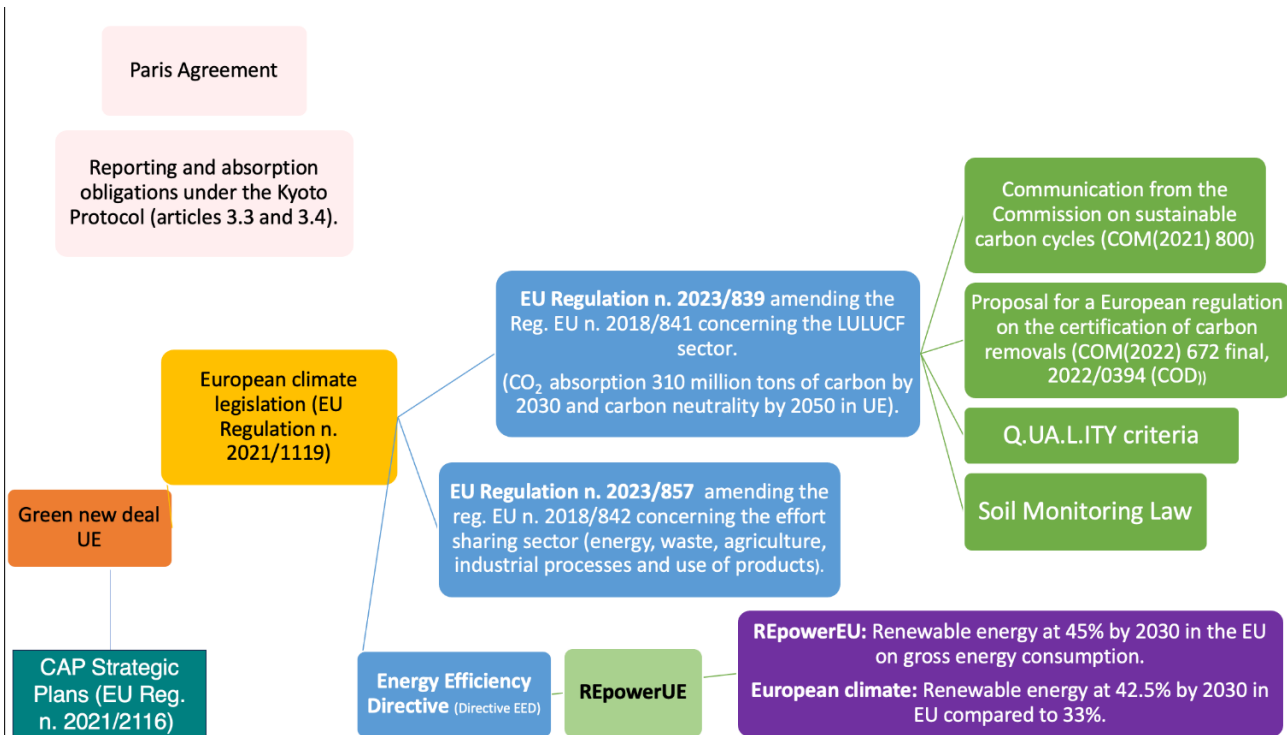


L'Unione Europea come finanzia tali servizi ecosistemici?

1. attraverso la **PAC**
2. **Schemi volontari di certificazione degli assorbimenti di carbonio:**
 - scopo di compensare emissioni generate dai settori non-ETS
 - incentivare o premiare le azioni e le pratiche di CF
 - Generare e vendere crediti di carbonio derivanti dalle pratiche di carbon farming su base volontaria



Il quadro politico



«Proposta di regolamento europeo per certificare assorbimenti e riduzioni di CO2 »:

- primo quadro regolamentare condiviso dell'UE
- incentiva le pratiche sostenibili a beneficio della biodiversità e dello stoccaggio del carbonio

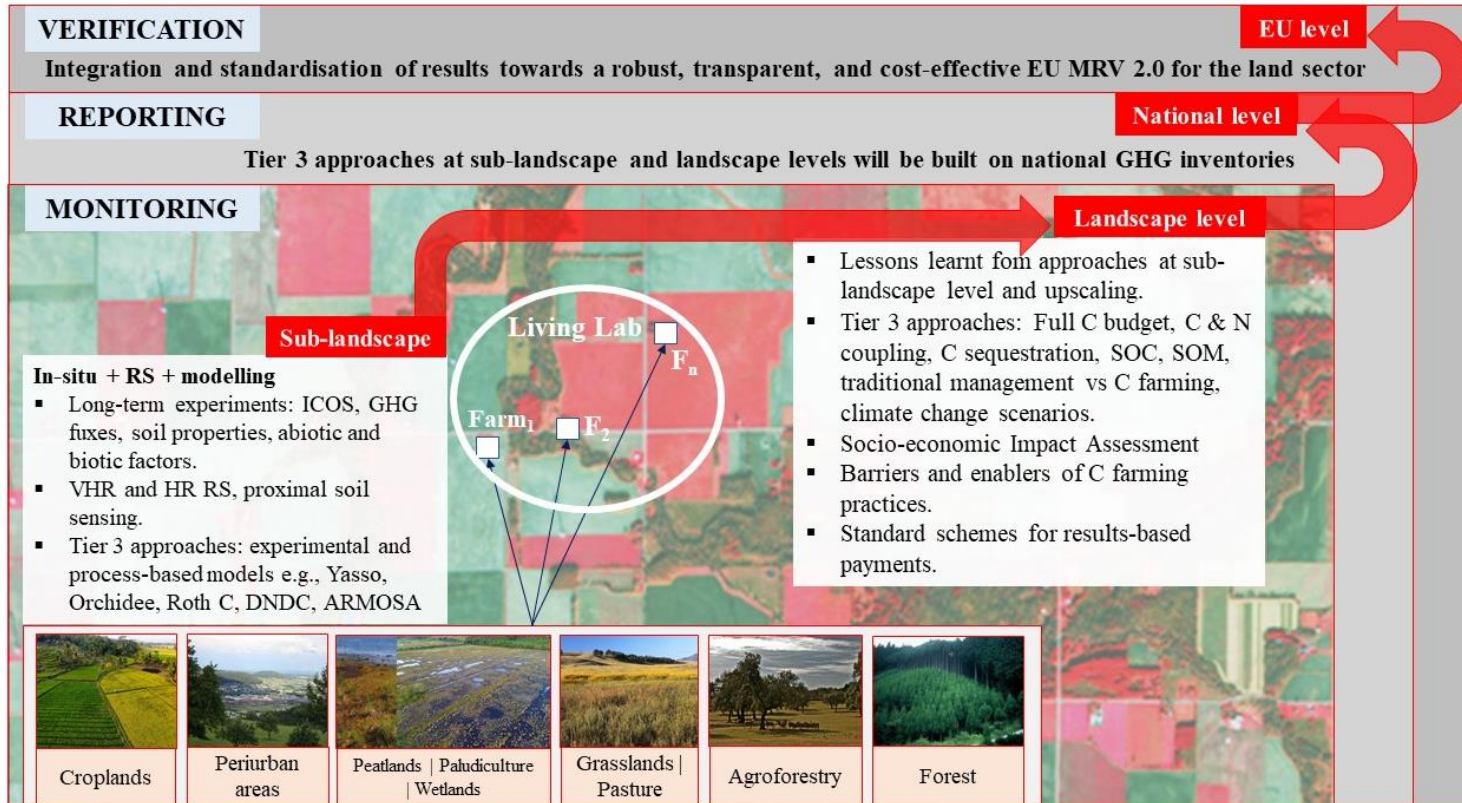
Politiche interconnesse

Pratiche previste per il Carbon Farming da normativa

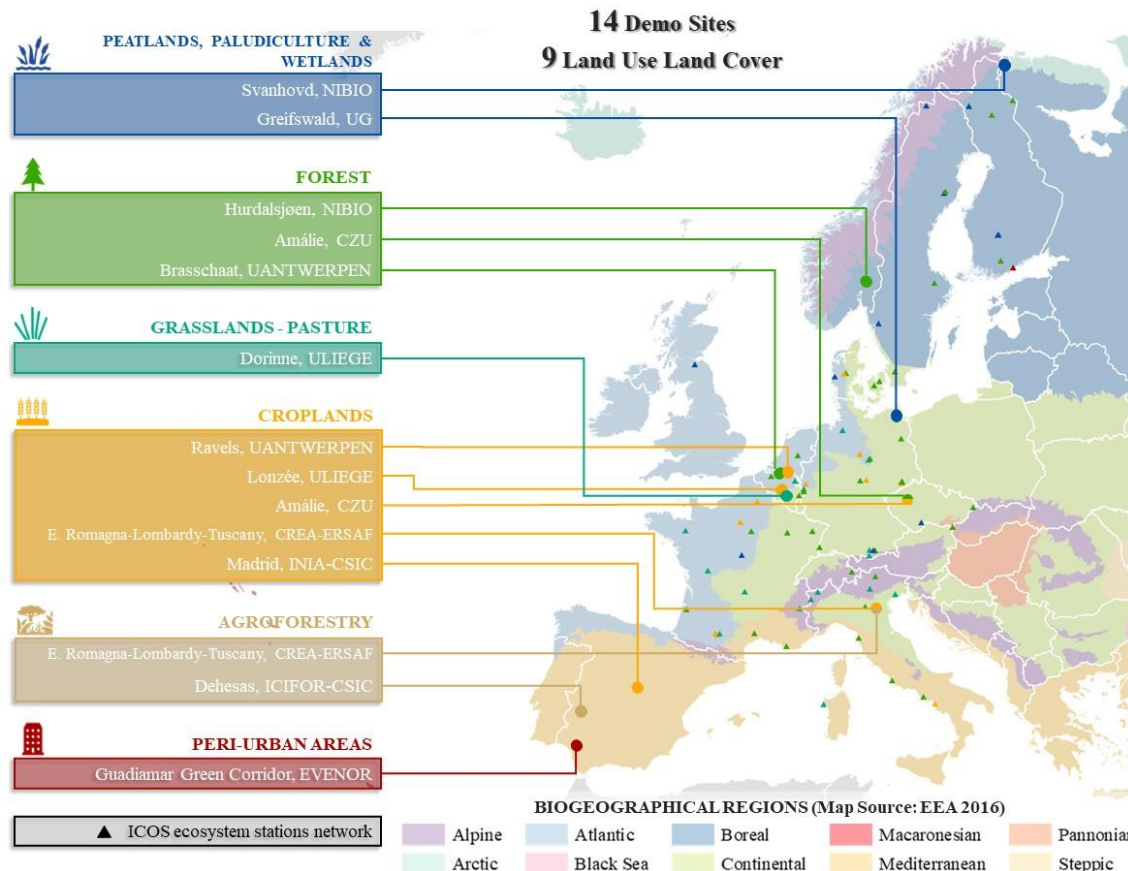
- Conversione da maggese a prati stabili
- Mantenimento di prati stabili
- Agroforestazione
- Colture di copertura
- Lavorazioni minime o nulle, agricoltura conservativa
- Conversione a maggese
- Recupero di aree paludose e torbiere



MRV4SOC Implementazione



Siti sperimentali



Risultati attesi

- ❑ **Inventario di dati disponibili a varie scale, compresi dati satellitari e catalogo online.**
- ❑ **Simulazioni di modelli del carbonio e dell'azoto e relativa incertezza modellistica**
- ❑ **Requisiti standard e miglioramento dei modelli ed in particolare dei modelli ORCHIDEE, RothC e ECOSSE**
- ❑ **Metodi di MRV (Monitoraggio, Reportistica e Verifica) affidabili e trasparenti**
- ❑ **Analisi socio economica**
- ❑ **Raccomandazioni politiche**

THE CARBON FARMING QUALITY CRITERIA



QUANTIFICATION



ADDITIONALITY



LONG-TERM
STORAGE



SUSTAINABILITY

[Carbon Removal Certification - European Commission \(europa.eu\)](https://european-council.europa.eu/media/en/press-operations/infographic-116436.pdf)

To secure a liveable future, the EU has committed to achieving climate neutrality by 2050. This means we need to drastically reduce our greenhouse gas emissions and compensate for residual emissions (e.g. from industry or agriculture) through carbon removals, which means **removing carbon dioxide (CO₂) from the Earth's atmosphere** via natural and technological solutions.

This [proposal](#) sets out a **voluntary EU-wide framework to certify carbon removals generated in Europe**. It sets out **criteria to define high-quality carbon removals** and the process to **monitor, report and verify the authenticity of these removals**. With this certification framework, our aim is to boost innovative carbon removal technologies and sustainable carbon farming solutions, while fighting greenwashing.

There are several ways to remove and store carbon. All can be certified under the EU's framework:

• **Nature-based solutions, such as restoring forests, soils, and innovative farming practices**

Quality criteria specific for Carbon Farming

A carbon farming activity shall provide a temporary net carbon removal benefit or a net soil emission reduction benefit, which shall be quantified using the following formulas:

(1)
$$\text{Temporary net carbon removal benefit} = CR_{\text{baseline}} - CR_{\text{total}} - GHG_{\text{associated}} > 0,$$

where:

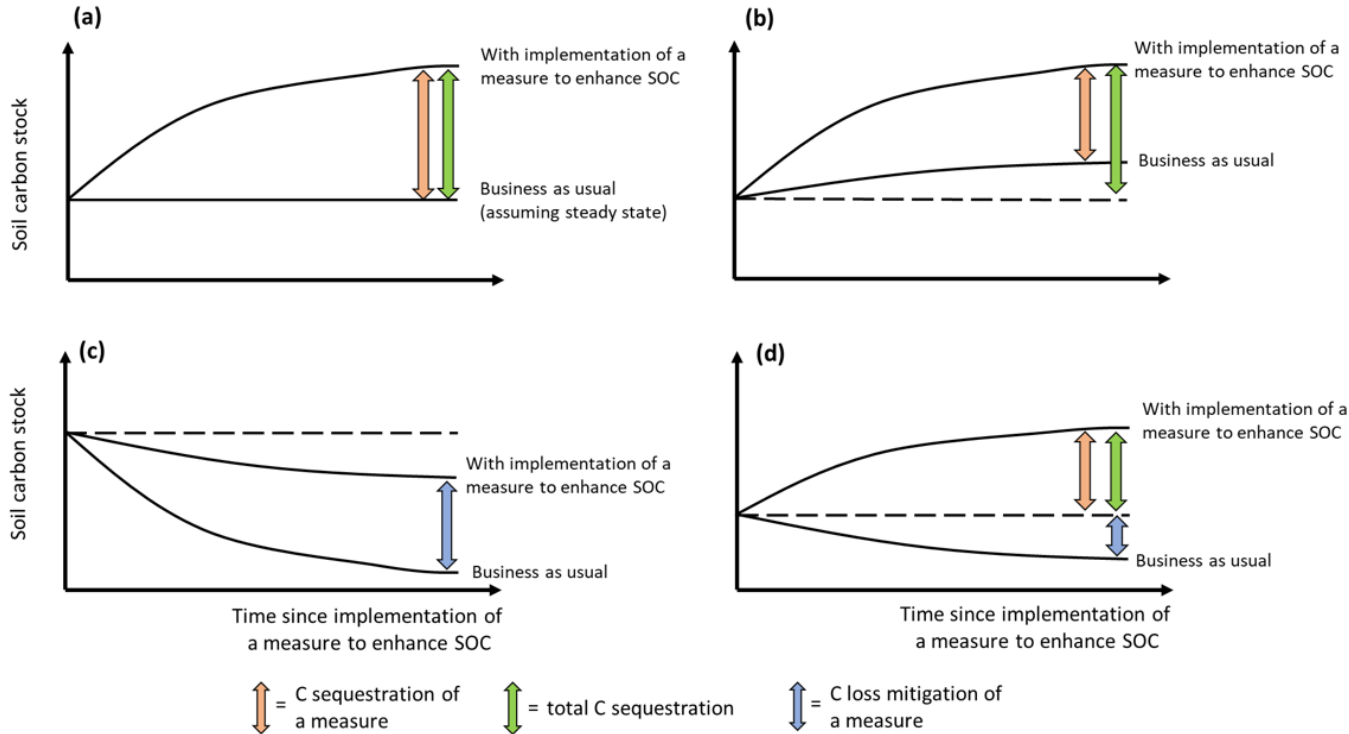
- (a) CR_{baseline} is the carbon removal under the baseline;
- (b) CR_{total} is the total carbon removal of the activity;
- (c) $GHG_{\text{associated}}$ is the increase in direct and indirect GHG emissions, over the entire lifecycle of the activity which are due to its implementation, including indirect land use change, calculated, where applicable, in accordance with protocols set forth in the 2006 IPCC Guidelines for National GHG Inventories and any further refinement.

For **carbon farming** there is the introduction of the concepts of **temporary net carbon removals** And **net soil emission reduction**

Note: To calculate the – **GHG** term of the equation a Life Cycle Analysis (LCA, carbon footprint analysis) is necessary.

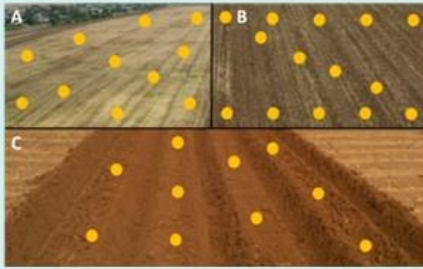
Co-benefits in terms of other ecosystem services (e.g. biodiversity) are **not yet inserted in the calculation.**

Baseline and Additionality



Baseline scenario	Additionality
(a) No climate change = baseline SOC will not change.	$\uparrow = \text{C sequestration of a measure}$ $= \Delta \text{SOC}$
(b) Climate change impact = increase baseline SOC content	$\uparrow = \text{C sequestration of a measure}$ $< \Delta \text{SOC}$
(c) Climate change impact = severely decrease the baseline SOC content.	$\downarrow = \text{C loss mitigation of a measure}$
(d) Climate change impact = lightly decrease the baseline SOC content.	$\uparrow = \text{C sequestration of a measure}$ & $\downarrow = \text{C loss mitigation of a measure}$

HARMONIZATION IN SCALE AND IN TIME

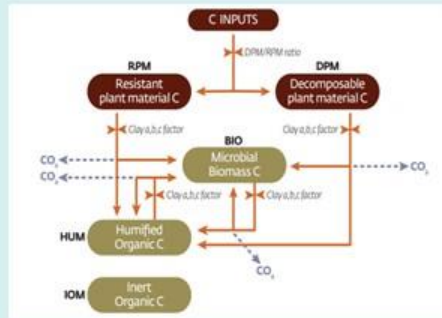


Different sampling protocols in field

Different analytical standards and procedures



Different pedoclimatic conditions



Different modeling

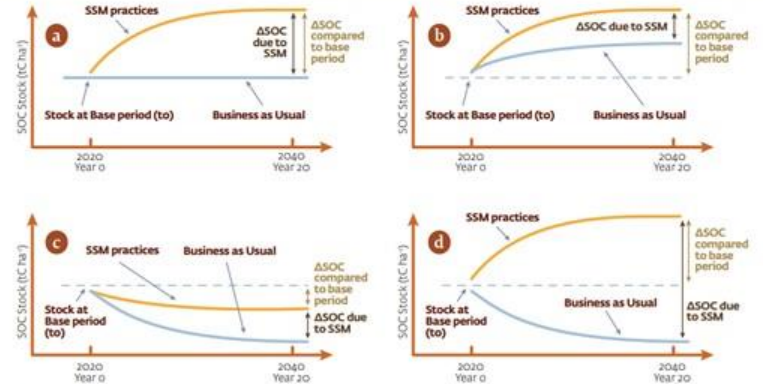


Figure 2 | Soil organic carbon theoretical evolutions under a business-as-usual (BAU) scenario and after the adoption of Sustainable Soil Management (SSM) practices. This depicts a) lands where SOC levels have reached equilibrium and it is possible to increase levels through SSM; b) lands where SOC is increasing but can be further increased through SSM; and lands where SOC is decreasing and it is possible to stop or mitigate losses in SOC levels (c), or even reverse this fall through SSM (d).

Possible different scenarios of the Business-As-Usual (BAU) due to climate change

FROM THE FIELD
SCALE
MONITORING



TO THE REPORTING AT
NATIONAL AND
CONTINENTAL SCALE

SOIL IS DIFFERENT IN SPACE AND IN TIME

STANDARD BASELINE ARE REQUESTED BY DG-ENV

ACTIVITY-SPECIFIC BASELINE BASED ON THE OPERATOR'S INDIVIDUAL PERFORMANCE

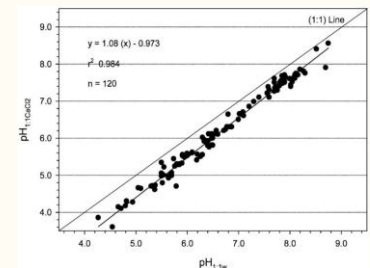
MRV4SOC OBJECTIVE IS TO SET-UP METHODS TO

SET-UP THE RECIPE =>

Elaborate **standardised procedures to determine** activity-specific baselines based on operator's individual performance.

The recipe is what we are elaborating **by** implementing WP2 harmonisation of input data and WP3 check of comparability of results using different modelling approaches.

- 1) The carbon models (RothC, DNDC...) should be run with data of fields, situated in the same pedo-landscapes (same boundary conditions), in which conventional farming practices are adopted (managed under regulatory conditions).
- 2) The comparability of carbon models should be checked.
- 3) Transfer functions between lab-methods should be applied
- 4) The uncertainty should be made explicit, as required by the CFCR.



Grazie dell'attenzione!

Presentazione realizzata con il contributo di

Marta Gomez Jimenez

Ilaria Falconi

Irene Criscuoli

Maria Fantappiè