Parallel Session 3

Strategies for mitigation of and adaptation to climate change.

Preliminary assessments for the regional implementation of the inventory of forest carbon stocks in Lombardy

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Task

Start up of the Regional Inventory of Forest Carbon sinks according to RL 24/2006

- Institutional and georeferenced technical tool
- Account for a carbon emission balance
- Strategies and mitigation of anthropogenic emissions

Regional Emission Inventory

- Assessing anthropogenic and natural activity GHG emissions for the main pollutant in order to support policy maker at local level.

- Regional emissions, estimated every two years on annual base, are available at provincial and municipal level too

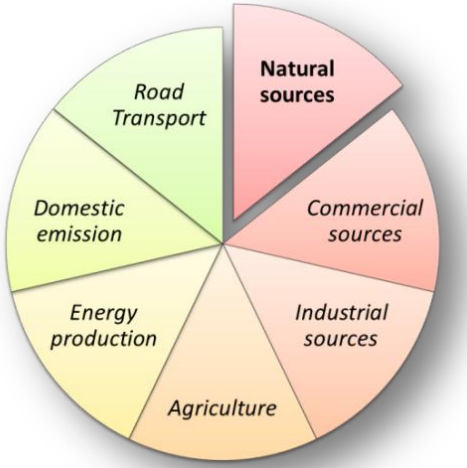
- The emission inventory is updated with the INEMAR database, based on international methodologies (EMEP/EEA Guidebook, IPCC GPG and sectorial studies) in order to give the best air emission assessment

- INEMAR database, developed by Lombardy Region, is shared with other seven regional partner and harmonized with the National Air Emission Inventory

Methodology

Regional Emission Inventory INEMAR

www.inemar.eu



Assessing and updating forest carbon stock and sink in all 1541 municipalities of the region during 1990-2008 through the application of the For-est model into INEMAR

Specific calculation module

Input

- *Growing stock*
- *Forest area*
- *Harvest*
- *Fire*

Modelling

- *Richards function*
- *Current increment*

$$I_i = A \cdot \frac{dy}{dt} = \left(\frac{k}{v} \cdot y \left[1 - \left(\frac{y}{a} \right)^v \right] + y_0 \right) \cdot A$$

Output

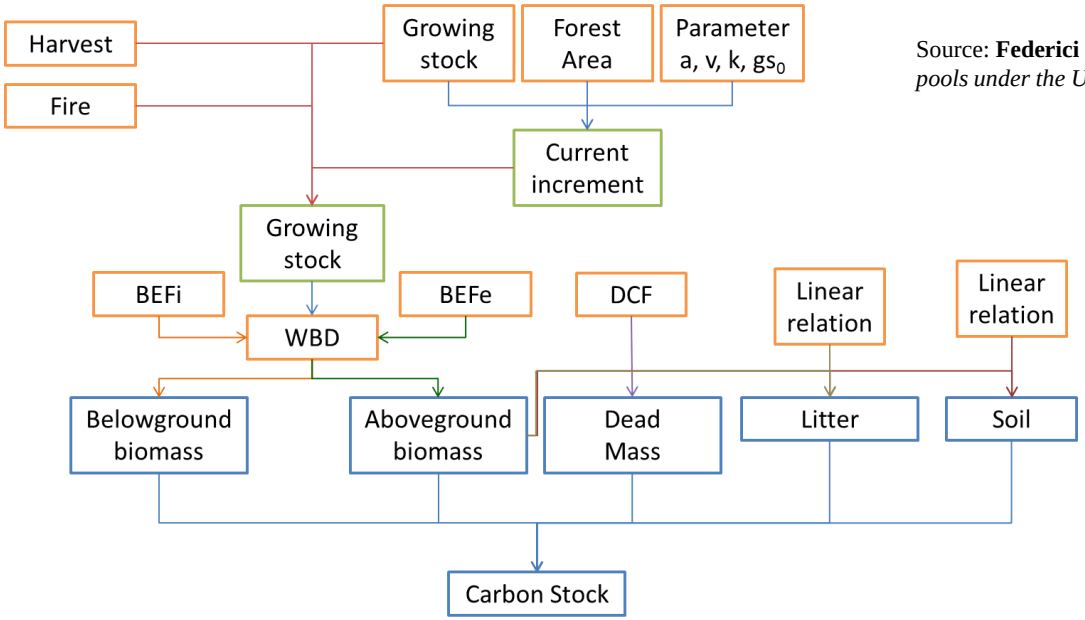
- *Carbon stock*
- *Carbon sink*

Methodology

Gain loss methodology in order to assess the evolution of the forest stock during the time

$$gs_i = gs_{i-1} + I_i - H_i - F_i - M_i - D_i$$

Annual growing stock



Source: **Federici et al., 2008**. *An approach to estimate carbon stocks change in forest carbon pools under the UNFCCC: the Italian case*. iForest 1: 86-95

Carbon stock at municipal level was assigned in view of the share of municipal area of each forest type in the Region

Methodology

→ *Forest area [ha]*

- **Regional forest area:** surface >2000m^2 and forest cover >20% surface (Regional Map of Forest Typologies)
- **Forest area 1990 – 2008**: linear interpolation between NFI (1985) and INFC (2005) information
- **Matrix**: correlation between Regional Forest Typologies and NFI categories

→ *Growing stock [m^3]*

- Growing stock for each forest categories - NFI (1985)

→ *Harvest [m^3]*

- National statistics at NUTS2 level - (ISTAT series: 1985 - 2008)

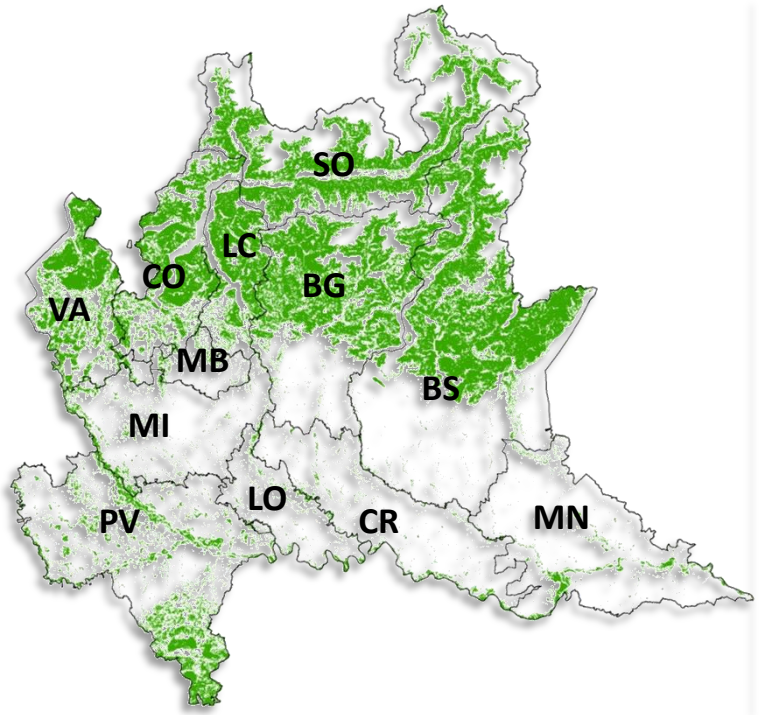
→ *Fire [m^3]*

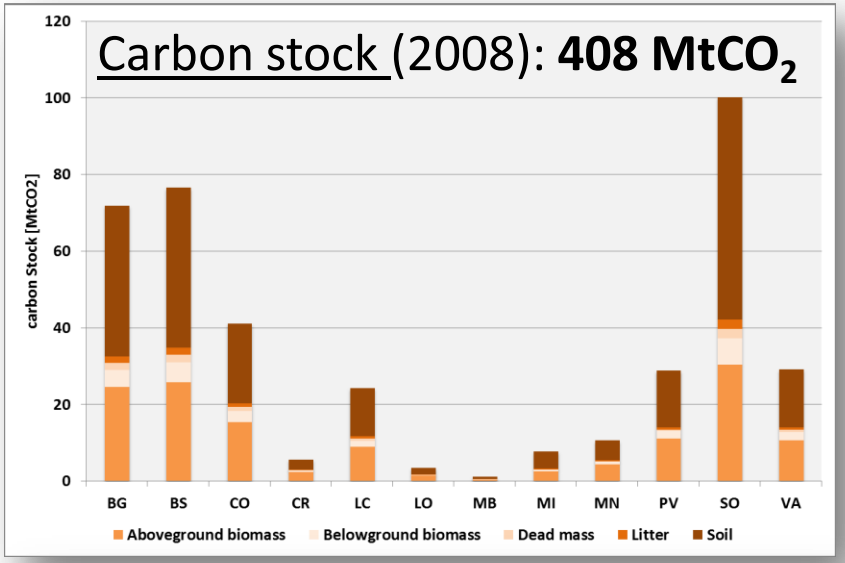
- National statistics at NUTS2 level - (ISTAT series: 1985 - 2008))

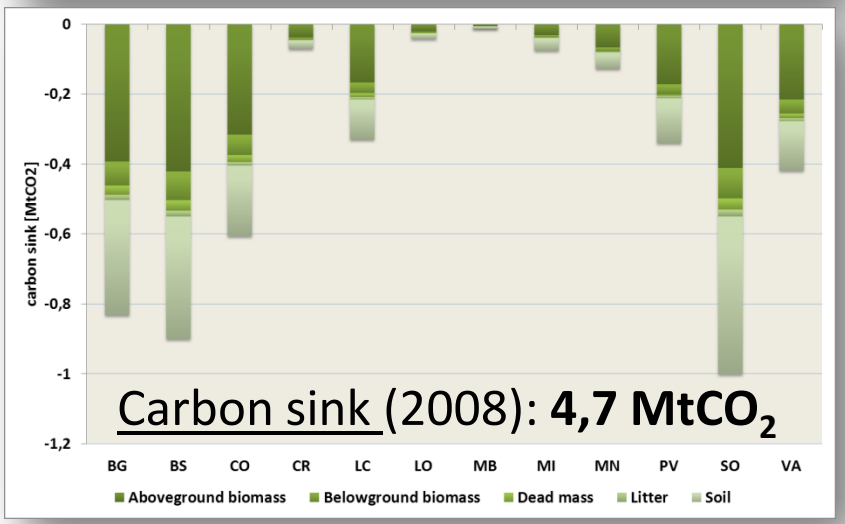
→ *Parameters*

- Biomass expansion factor (BEF), wood basic density, shoot/root ratio, linear relation (stands biomass, soil & litter) – (ISPRA: National Inventory Report)

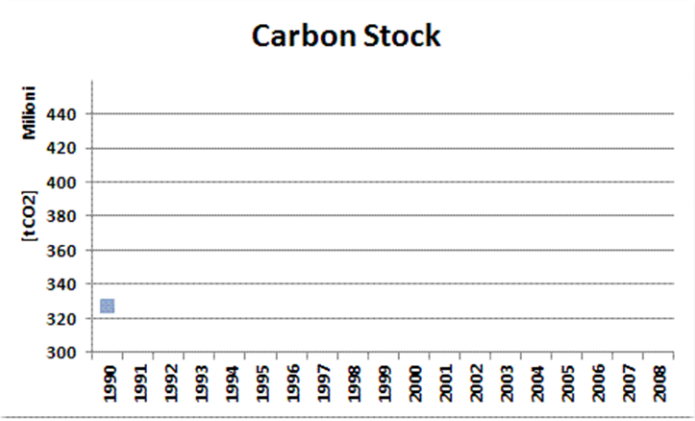
Results

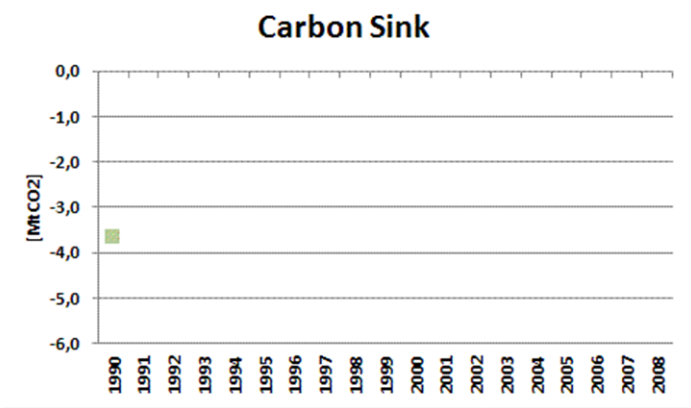






- **Soil** is the relevant carbon pool in term of **stock (54%)**
- **Living biomass** is the relevant one in term of **absorbtion (57%)**

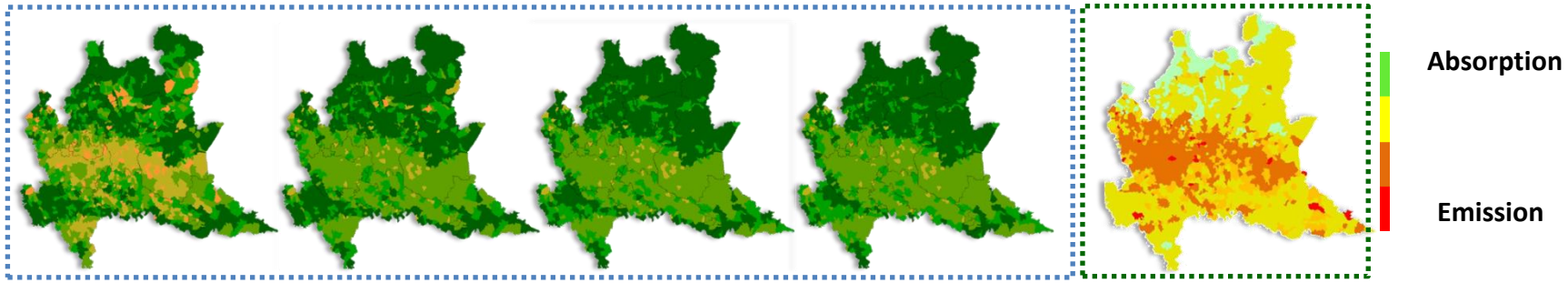




Results

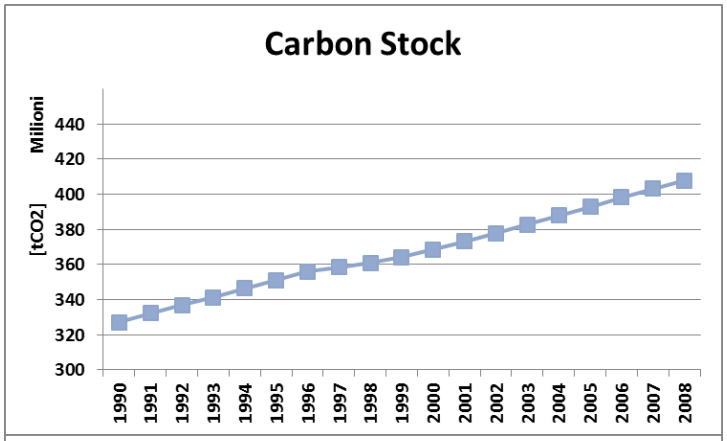
Consistency and coherence during the time

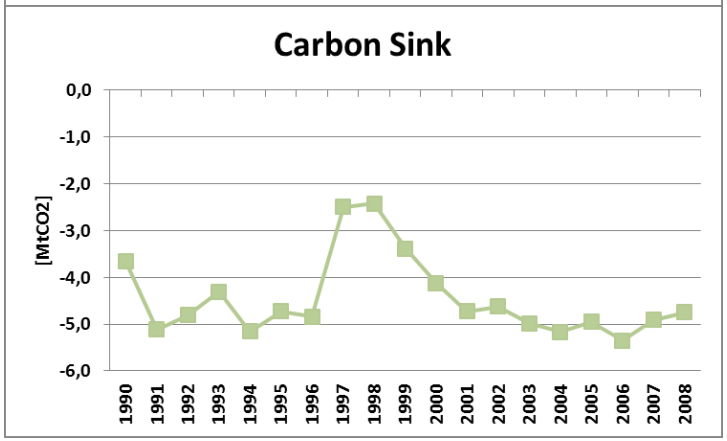
Municipal CO_2 balance



Future developments

- Input data at municipal level
- Coherent association among NFI, INFC and regional forest system
- Growing stock from the INFC
- New interpolation for forest area evolution on the basis of National Forest Inventory and regional land use
- Characterization of detailed set of parameters according to the regional forest typologies





Results

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