Soil Carbon Accumulation and potentials for Carbon Trading

Dr. Claudia Bulgheroni

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Relevance of soil carbon accumulation (e_{sca})

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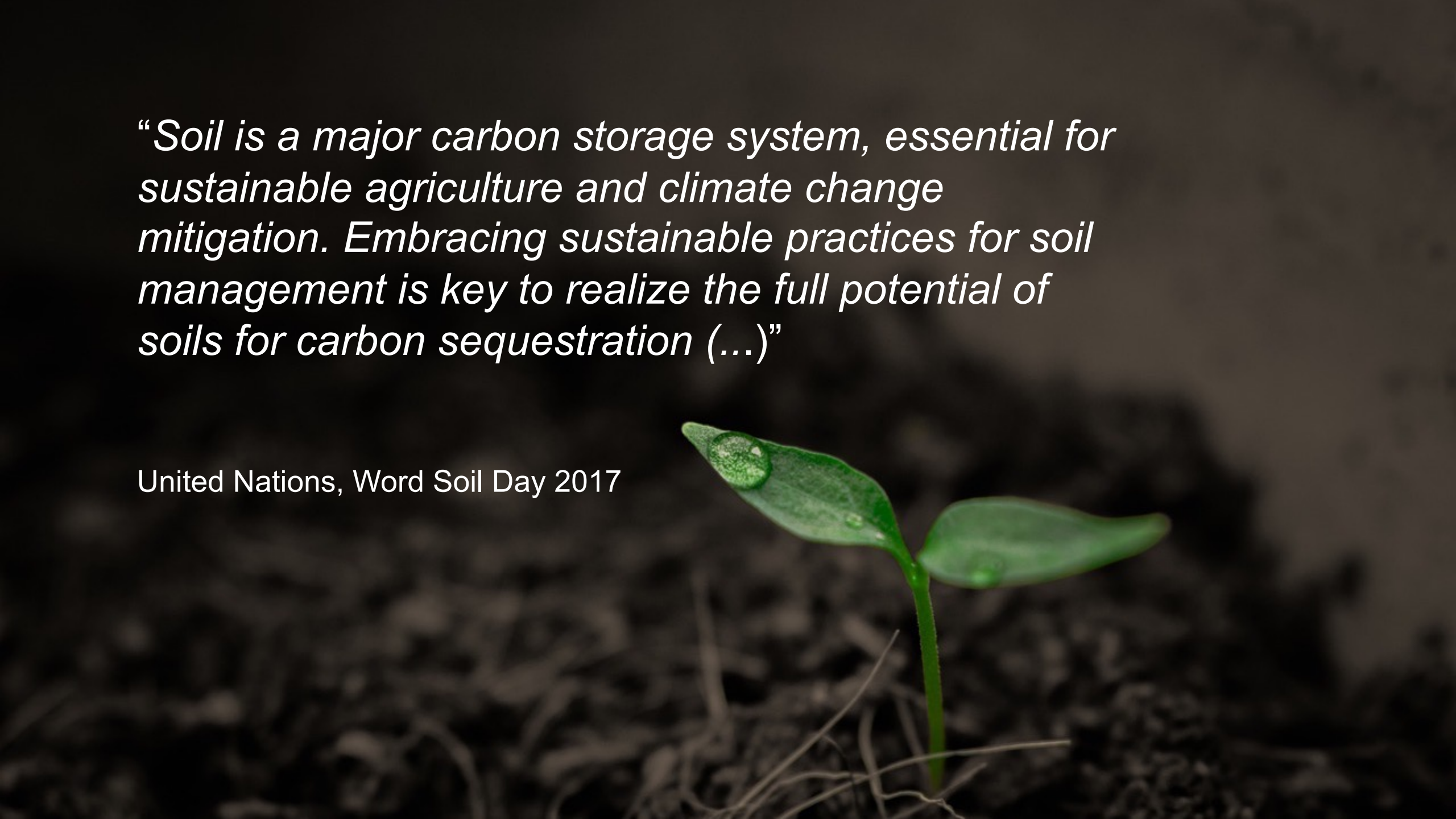
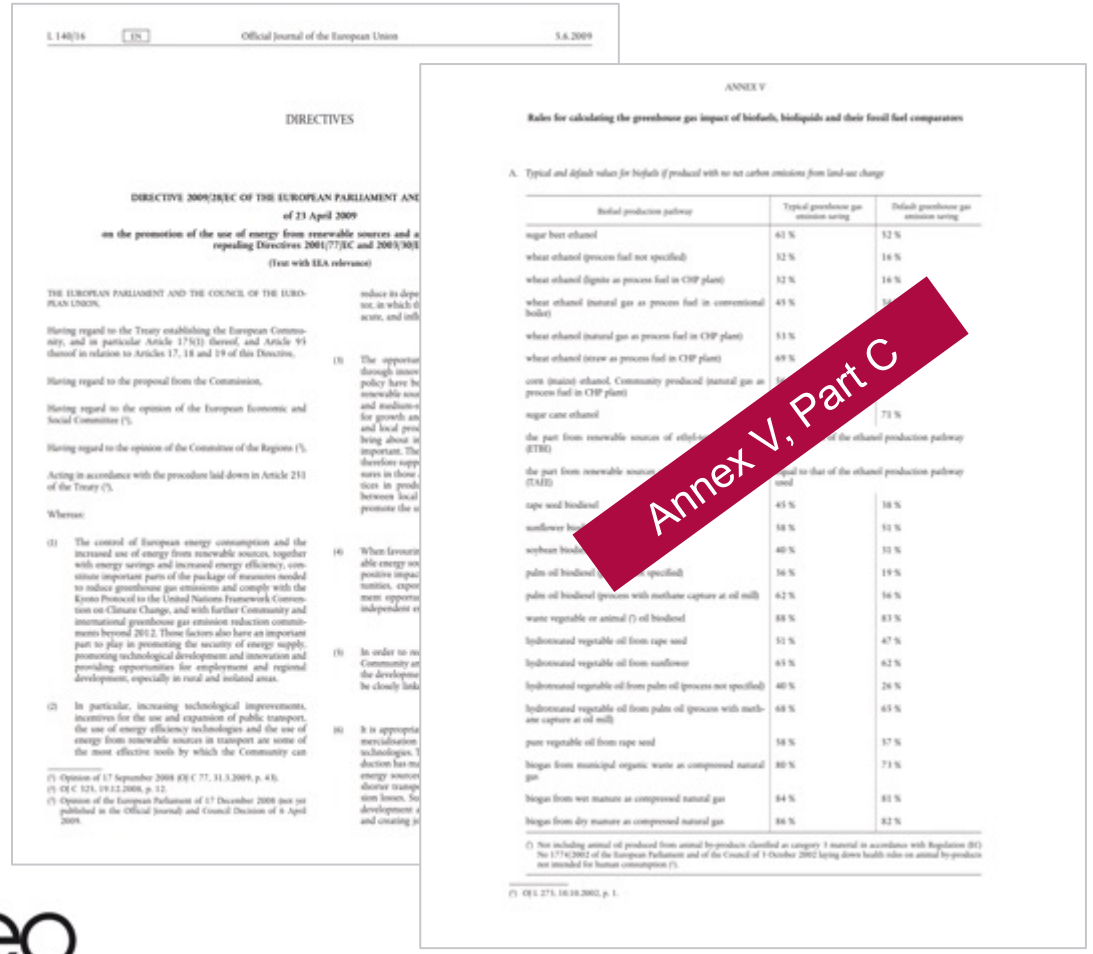
Potentials of soil carbon accumulation in the carbon offsetting market

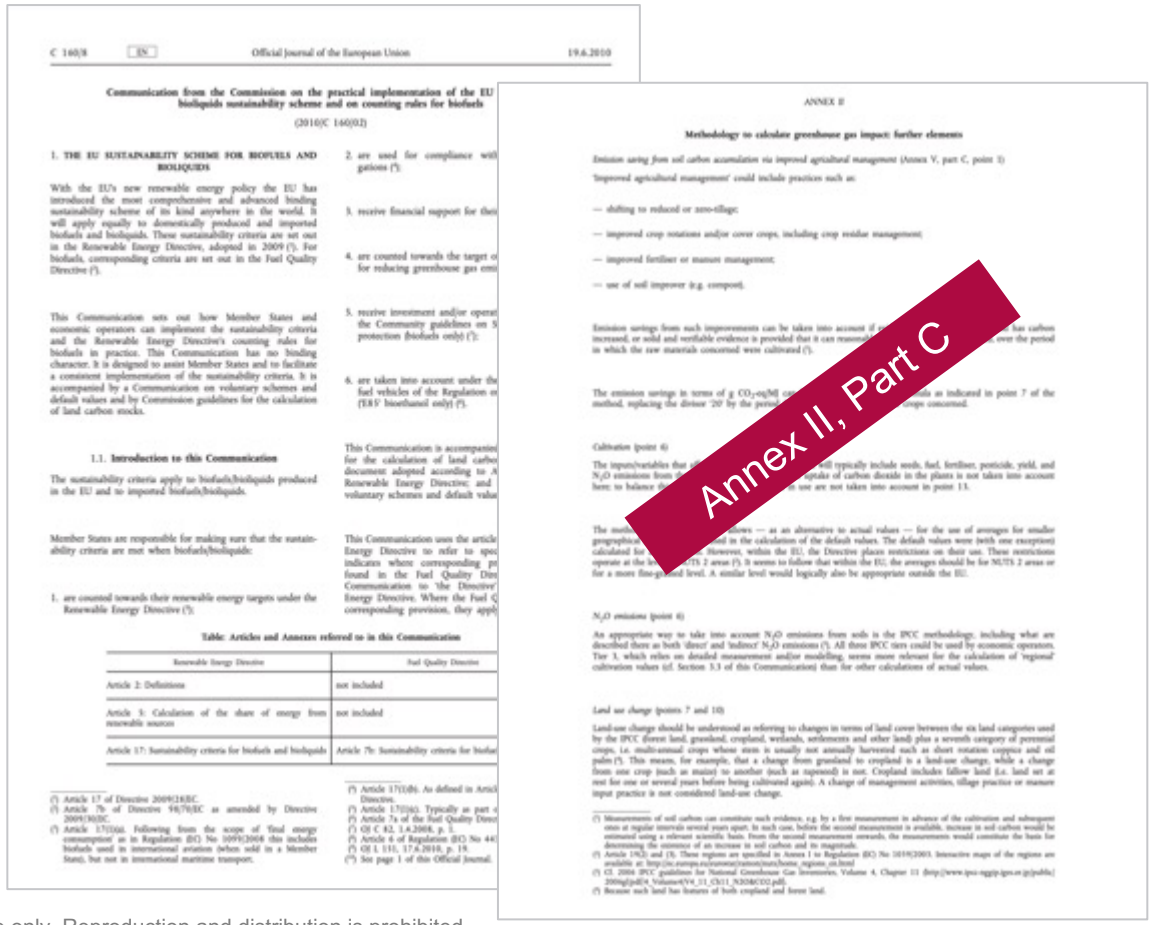

“Soil is a major carbon storage system, essential for sustainable agriculture and climate change mitigation. Embracing sustainable practices for soil management is key to realize the full potential of soils for carbon sequestration (...)”
United Nations, Word Soil Day 2017

The REDII and the COM 2010/C 160/10 set the legislative framework to account GHG savings due to soil carbon accumulation

Renewable Energy Directive (EU 2018/2001)



EC Communication on the practical implementation of the EU biofuels and bioliquids sustainability scheme (COM 2010/C 160/10)



REDII Annex V provides the GHG calculation formula where **soil carbon accumulation** (e_{sca}) is accounted as GHG savings

$$E = e_{ec} + e_l + e_p + e_{td} + e_u - e_{sca} - e_{CCS} - e_{CCR} - e_{ee}$$

E	-	Total GHG emissions from supply and use of the fuel (in g CO_{2eq}/MJ)
e_{ec}	-	GHG emissions from the extraction or cultivation of raw materials
e_l	-	Annualized (over 20 years) GHG emissions from carbon stock change due to land use change
e_p	-	GHG emissions from processing
e_{td}	-	GHG emissions from transport and distribution
e_u	-	GHG emissions from the fuel in use (shall be taken to be zero)
e_{sca}	-	GHG emissions savings from soil carbon accumulation via improved agricultural management
e_{ccs}	-	GHG emissions savings from carbon capture and geological storage
e_{ccr}	-	GHG emissions savings from carbon capture and replacement
e_{ee}	-	GHG emissions savings from excess electricity from cogeneration

Source: Renewable Energy Directive (2009/28/EC) and RED recast (2018/2001/EU)

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Improved agricultural management practices leading to soil carbon accumulation, as defined by COM 2010/C 160/10

- Shifting to reduced or zero tillage

- Improved crop rotations and/or cover crops, including crop residues management

- Improved fertilizers or manure management

- Use of soil improver (e.g. compost)

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Requirements for claiming GHG emissions savings from soil carbon accumulation via improved agricultural management (e_{sca})

e_{sca} can be claimed if evidence is provided that:

- agricultural management practices potentially leading to soil carbon accumulation were adopted **after January 2008,**
- those are implemented **in best practice,** so that an increase in soil carbon can be expected over the period in which the raw materials concerned were cultivated,

Measurement of soil carbon could also serve as **additional evidence.**

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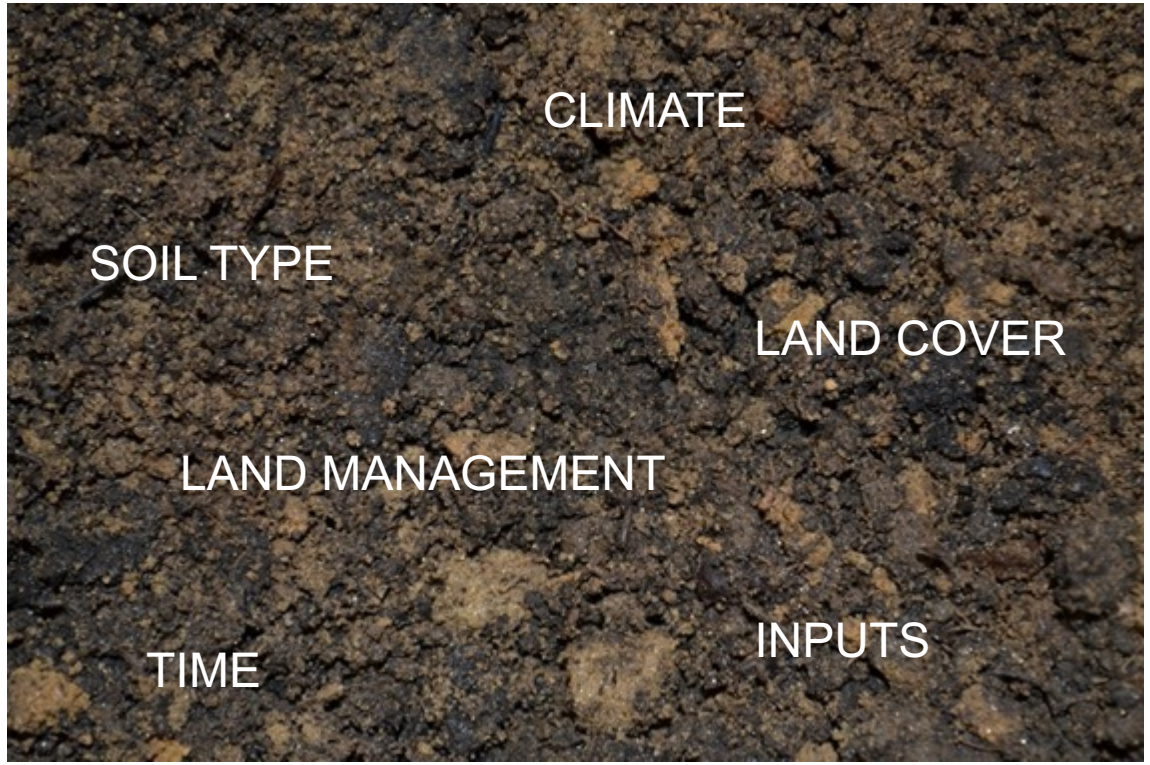
The carbon stock (CS) associated with reference (CS_R) and actual (CS_A) status is influenced by **different soil factors***



In the e_{sca} calculation, 3 options are possible to determine carbon stock:

1. Use of standard values of IPCC(2006) guidelines approach
2. **Field measurements**
3. Other appropriate methods, provided that they take into account **climate, soil type, land cover, land management and inputs** (e.g. modelling + field measurement)

* The Commission Decision 2010/335 gives further **guidance** for the definition of soil factors in calculating carbon stocks

Requirements and restrictions for applying e_{sca} savings under ISCC

ISCC Recent Sytem Updates

- e_{sca} emissions savings have to be calculated as **actual values** mirroring what happens in the field (i.e. individual farm level).
- The actual values **cannot** be calculated by **averaging emissions** values of farmers who use e_{sca} with farmers who do not use e_{sca}.
- Regional approach **is not allowed.**
- Carbon Stocks (CS_R and CS_A) must be verifiable and can be determined:
  - Using **IPCC standard values.***
  - Via calculation approaches **other than IPCC,** but a report with the complete calculation methodology must be provided to the ISCC. When field measurements/modelling methods are used, the first field measurement defines CS_R and CS_A is measured periodically.
- **Reference** Carbon Stock (CS_R) **must be set before** the improved agriculture management is applied.

https://www.iscc-system.org/update/10-march-2021

*ISCC System Document 205 “Greenhouse Gas Emissions”

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ISCC is developing a **Guidance Document for the Calculation and Verification of Emission Savings from Soil Carbon Accumulation**

Waiting for the EU Implemented Act

Main issues tackled in the upcoming ISCC Guidance

- Extended general provisions
- **Recommendations** to calculate e_{sca} as **actual values.**
- Requirements and **restrictions to IPCC approach** to determine carbon stocks and respective changes
- Detailed recommendations on **how to conduct field measurments** on representative soil sample, to determine carbon accumulation in soil
- Requirements for the **use of field measurements combined with soil modelling (still to be confirmed)**
- Guidelines for forwarding and verifying e_{sca} values

Work in progress…

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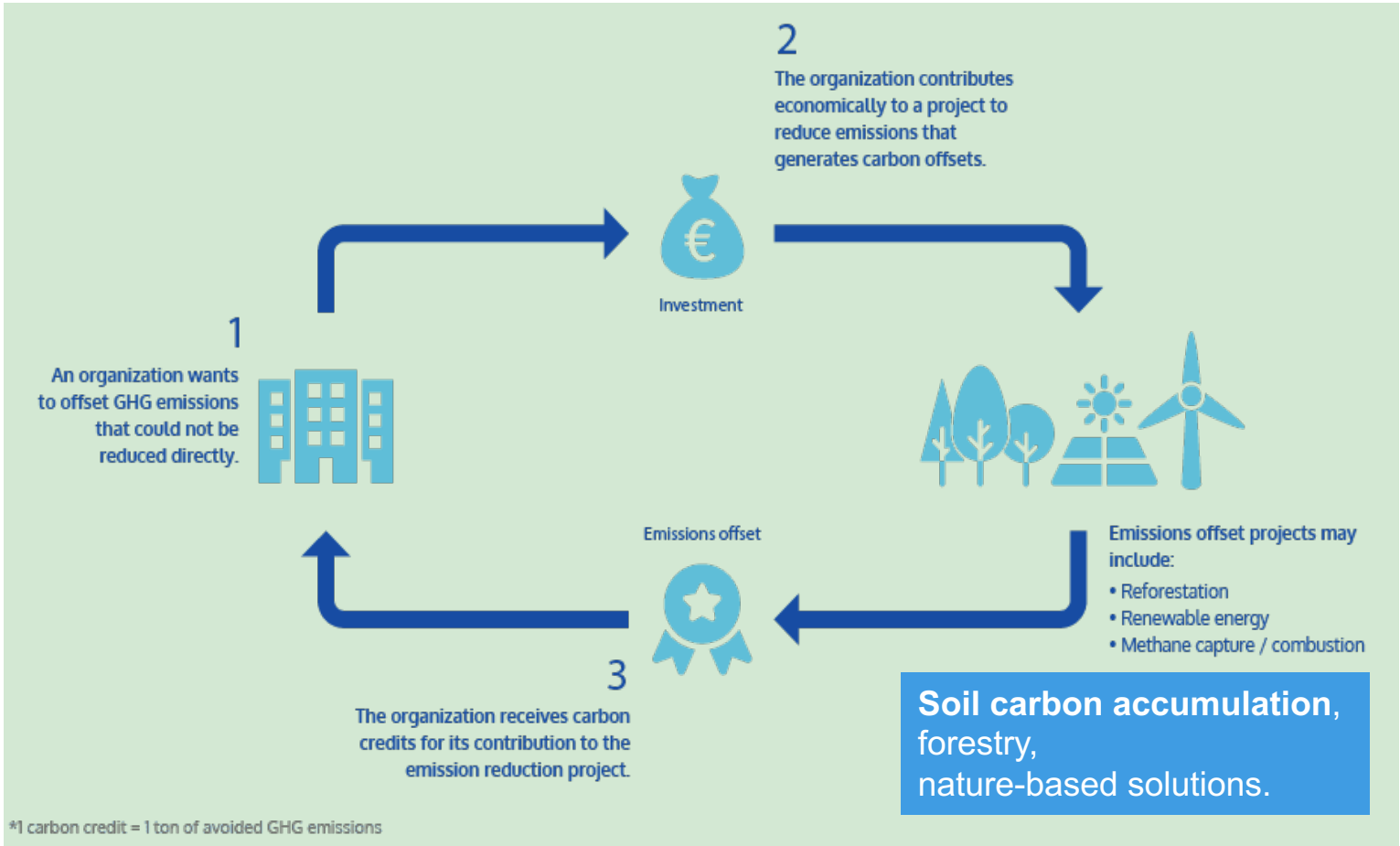
The carbon compensation or offsetting

- Carbon compensation is a **policy instrument to enhance sustainability** by reducing GHG emissions
- Carbon offsetting means **buying carbon credits** from emissions reduction/prevention projects in one location, in order **to compensate for an equivalent amount of emissions** in another location

- **1 carbon credit = 1 ton of avoided CO_2 eq emissions**
- In order to generate carbon credits, projects should:
  - ✓ meet **specific requirements** (additionality, permanence, etc)
  - ✓ apply approved methodology & guidance,
  - ✓ successfully pass third-party verification



https://www.climatetrade.com/carbon-offsetting/

Sustainable agriculture and forestry projects have currently a great potential for carbon offsetting. Many of those focus on **soil carbon accumulation**

Project types Agriculture, Land management, agroforestry	General requirements*						
	Additionality	Verifiability	Avoidance of double counting	Effective	Prevention of leakage	Not harmful	Legal
Improved agricultural practices for soil carbon accumulation							
- Improved crop rotation schemes (e.g. differentiation of crop patterns)	x	x	x	x	x	x	x
- Introduction of cover crops	x	x	x	x	x	x	x
- Measures to prevent/reduce soil erosion	x	x	x	x	x	x	x
- Measures to improve soil fertility	x	x	x	x	x	x	x
- Measures to improve soil health and soil biodiversity	x	x	x	x	x	x	x
- Improved management of agricultural residues *(e.g. no removal, no burning)*	x	x	x	x	x	x	x
- Switch to zero/reduced tillage	x	x	x	x	x	x	x
Sustainable and climate smart agricultural practices							
- Practices that increase the resilience of farming systems	x		x	x	x	x	x
- Measures to improve water use efficiency	x	x	x	x	x	x	x
- Introduction of resistant crop varieties	x	x	x	x	x	x	x
Sustainable Agroforestry							
- Increase forest cover of non-forest land	x	x	x	x	x	x	x

Any other ideas? Please contact us!

* As defined by the most diffused Standards on the market

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ISCC is investigating on a **carbon trading platform** focusing on the voluntary market and allowing GHG emission compensation

The **functions** of a carbon trading platform are:

- **Buying carbon credits** directly from project developers
- **Selling carbon credits** to the interested stakeholder
- Ensuring that **ecosystem services** provision and **biodiversity** conservation are addressed by carbon offsetting projects
- Providing **additional functions** to support and promote emission reduction (e.g. carbon footprint calculation, needs of carbon credits estimate, etc)

ISCC is looking for partners to conduct pilot projects

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Many thanks for your attention!

Meo Carbon Solutions GmbH
Hohenzollernring 72, 50672 Cologne, Germany
Email: bulgheroni@meo-carbon.com

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