

# A review of soil C accounting initiatives implemented in EU and extra-EU countries

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WORK PACKAGE 8  
SCIENCE TO POLICY



# Context



Brussels, 30.11.2022  
COM(2022) 672 final  
2022/0394 (COD)

Proposal for a

**REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL**

**establishing a Union certification framework for carbon removals**

{SEC(2022) 423 final} - {SWD(2022) 377 final} - {SWD(2022) 378 final}

- Focus on Carbon removals obtained through Carbon farming:
  - Text proposed is still very vague from the methodology point of view
  - Still necessary to adopt delegated acts setting out the certification methodologies

# Aim

- To contribute to the debate with lessons learned from extra-EU C accounting initiatives



- <https://ec.europa.eu/eusurvey/runner/DGCLIMA-CRETA-EU-Survey20230414>



5<sup>th</sup> of May 2023

# Agricultural soil C accounting methodologies analyzed



Quantification Protocol  
For Conservation  
Cropping Version: 1.0  
*(withdrawn)*



Avoided conversion of  
grasslands and shrublands  
to crop production 2.0



Nori Croplands  
Methodology, v 1.3



Soil Enrichment Protocol  
v 1.1

Avoided grassland  
conversion protocol 2.1



VM0042 Methodology for  
Improved Agricultural  
Land Management v 1.0  
*(Under revision)*



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*(Not approved yet)*



**Australian Government**

Supplement to the Carbon Credits  
(Carbon Farming Initiative – Estimation  
of Soil Organic Carbon Sequestration  
using Measurement and Models)  
Methodology Determination 2021



# How do different C accounting initiatives deal with:















- ✓ Market accessibility
  - ✓ Eligible agricultural practices
  - ✓ Lands eligibility
  - ✓ Baseline
  - ✓ Soil C assessment method:
    - ✓ Modeling
    - ✓ Default values
    - ✓ Remote sensing
    - ✓ Soil sampling
  - ✓ Soil sampling for C estimates:
    - ✓ Sampling scale
    - ✓ Minimum number of soil samples
    - ✓ Sampling Method
    - ✓ C assessment method
    - ✓ Frequency of sampling
- ✓ Permanence
  - ✓ Reversal
  - ✓ Leakage
  - ✓ Other Carbon pools accounted for
  - ✓ Other GHG emissions accounted for
  - ✓ Additionality
  - ✓ Frequency of monitoring
  - ✓ Use of GIS and satellite images for project development and monitoring
  - ✓ Validation and verification body
  - ✓ Crediting period
  - ✓ Other soil quality monitoring
  - ✓ Projects/credits issued

SIMILARITIES

















DIFFERENCES

















# Market accessibility, credits issued

| COUNTRY                                                                             | ORGANIZATION/<br>PROGRAMME                                                          | METHODOLOGY                                                            | MARKET ACCESSIBILITY                                       | PROJECTS/CREDITS ISSUED on 29 <sup>th</sup><br>March 2023 |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------|------------------------------------------------------------|-----------------------------------------------------------|
|    |    | Avoided conversion of grasslands and shrublands to crop production 2.0 | Voluntary<br>Regulated (California Cap-and-Trade + CORSIA) | 1 project/166.197 credits                                 |
|    |    | Soil Enrichment Protocol v 1.1                                         | Voluntary<br>Regulated (California Cap-and-Trade)          | 3 projects/133.646 credits                                |
|                                                                                     |                                                                                     | Avoided grassland conversion protocol 2.1                              |                                                            | 20 project/241.330 credits                                |
|    |    | VM0042 Methodology v 1.0                                               | Voluntary                                                  | 60 projects/0 credits                                     |
|    |    | Nori Croplands Methodology, v 1.3                                      | Voluntary                                                  | 18 projects/123.607 credits                               |
|    |    | Quantification Protocol For Conservation Cropping Version: 1.0         | Regulated                                                  | 122 project (active, inactive and closed)/650.000 credits |
|  |  | Methodology Determination 2021                                         | Voluntary<br>Regulated                                     | 454 projects/1,904 ACCUs issued only for 1 project        |
|  |  | Proposal of regulation for the certification of carbon removals        | Voluntary                                                  | <b>X</b>                                                  |















# Baseline

| COUNTRY                                                                             | ORGANIZATION/<br>PROGRAMME                                                          | METHODOLOGY                                                            | BASELINE                                                                                                                                                                                                                                                                                                     |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     |    | Avoided conversion of grasslands and shrublands to crop production 2.0 | Scenario of conversion to croplands and associated practices.<br>Updated every 5 years.<br>Identification of the conversion agent or probability.                                                                                                                                                            |
|     |    | Soil Enrichment Protocol v 1.1                                         | Min. of 3 years of historical management information.<br>Use of regional average allowed after quality check by CAR.                                                                                                                                                                                         |
|     |    | Avoided grassland conversion protocol 2.1                              | Scenario of conversion to croplands and associated practices.<br>Valid for up to 50 years.<br>Default emission factors developed through a probabilistic approach.                                                                                                                                           |
|     |    | VM0042 Methodology v 1.0                                               | Scenario of continuation of pre-project agricultural management practices.<br>Min. of 3 years.                                                                                                                                                                                                               |
|     |   | Nori Croplands Methodology, v 1.3                                      | Prior 10 years of historical agronomic practices and past weather data.<br>Historical management data for at least 3 years + proxies taken from databases (such as USDA/NRCS) by Nori.<br>Dynamic baseline updated based on new weather data.                                                                |
|    |   | Quantification Protocol For Conservation Cropping<br>Version: 1.0      | Conservative tillage management: Census of Agriculture + carbon seq. default values.<br>Summerfallow reduction: use a historic, project baseline based on 3 years records.                                                                                                                                   |
|  |  | Methodology Determination 2021                                         | Scenario describing 5 years historical data where the land was used for pasture, cropping or bare fallow + soil sampling (t0).                                                                                                                                                                               |
|  |  | Proposal of regulation for the certification of carbon removals        | “The standard carbon removal performance of comparable activities in similar social, economic, environmental and technological circumstances and take into account the geographical context. Where duly justified, the baseline may be based on the individual carbon removal performance of that activity.” |

# Additionality, Agricultural practices















| COUNTRY                                                                            | ORGANIZATION/<br>PROGRAMME                                                          | METHODOLOGY                                                            | ADDITIONALITY                                                                                          | AGRICULTURAL PRACTICES ALLOWED                                                                                                                                                                             |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    |    | Avoided conversion of grasslands and shrublands to crop production 2.0 | Regulatory surplus test<br>Performance standard test                                                   | Avoided conversion of grasslands and shrublands to croplands                                                                                                                                               |
|    |    | Soil Enrichment Protocol v 1.1                                         | New practice<br>Regulatory surplus test<br>Performance standard test                                   | Fertilization, amendments, irrigation, tillage, residues management, crop rotation, cover crop, fossil fuel, grazing.                                                                                      |
|                                                                                    |                                                                                     | Avoided grassland conversion protocol 2.1                              | Regulatory surplus test<br>Performance standard test                                                   | Avoided conversion of grasslands to croplands                                                                                                                                                              |
|    |    | VM0042 Methodology for Improved Agricultural Land Management v 1.0     | New or change in practices (at least 5% delta)<br>Regulatory surplus test<br>Performance standard test | Fertilization, amendment, irrigation, tillage, residues management, crop rotation, cover crop, agroforestry, grazing.                                                                                      |
|    |    | Nori Croplands Methodology, v 1.3                                      | Must show SOC increment over baseline scenario                                                         | Fertilization, amendments, irrigation, tillage, residues management, crop rotation and crop intensity, cover crops, perennials                                                                             |
|   |   | Quantification Protocol For Conservation Cropping Version: 1.0         | New practice                                                                                           | No till + Shifting from fallow to continuous cropping if managed with no till                                                                                                                              |
|  |  | Methodology Determination 2021                                         | New practice                                                                                           | Fertilization, amendments, irrigation, inversion tillage, clay spreading, liming, catch crops, cover crops, re-establishing grazing, ecc...                                                                |
|  |  | Proposal of regulation for the certification of carbon removals        | Regulatory surplus test<br>Due to the incentive effect of the certification                            | Should take into account farming practices as referenced in the Communication on Sustainable Carbon Cycles: afforestation, agroforestry, conservative soil management, conversion, restoration of peatland |

# Soil Carbon assessment method

| COUNTRY                                                                            | ORGANIZATION/<br>PROGRAMME                                                          | METHODOLOGY                                                            | SOIL CARBON ASSESSMENT METHOD                |                             |                 |                              |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------|-----------------------------|-----------------|------------------------------|
|                                                                                    |                                                                                     |                                                                        | MODELING                                     | DEFAULT VALUES              | REMOTE SENSING  | SOIL SAMPLING                |
|    |    | Avoided conversion of grasslands and shrublands to crop production 2.0 | ✓<br>e.g. DAYCENT                            | ✗                           | ✗               | ✓<br>Alternative to modeling |
|    |    | Soil Enrichment Protocol v 1.1                                         | ✓<br>+ sampling                              | ✗                           | ✗               | ✓<br>t0+t5,t10... + modeling |
|                                                                                    |                                                                                     | Avoided grassland conversion protocol 2.1                              | ✗                                            | ✓<br>probabilistic approach | ✗               | ✗                            |
|    |    | VM0042 Methodology for Improved Agricultural Land Management v 1.0     | ✓<br>optional                                | ✗                           | ✓<br>optional   | ✓<br>mandatory               |
|    |    | Nori Croplands Methodology, v 1.3                                      | ✓<br>Tier-3 DAYCENT                          | ✗                           | ✗               | ✗                            |
|   |   | Quantification Protocol For Conservation Cropping Version: 1.0         | ✓<br>Empirical model based on default factor | ✓                           | ✗               | ✗                            |
|  |  | Methodology Determination 2021                                         | ✓<br>optional                                | ✗                           | ✗               | ✓<br>mandatory               |
|  |  | Proposal of regulation for the certification of carbon removals        | ?<br>not mentioned                           | ?<br>mentioned              | ?<br>encouraged | ?<br>not mentioned           |



# Permanence, reversal and leakage

| COUNTRY                                                                            | ORGANIZATION/<br>PROGRAMME                                                          | METHODOLOGY                                                            | PERMANENCE                                                                                             | REVERSAL                                                                       | LEAKAGE                                                                                                                        |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
|    |    | Avoided conversion of grasslands and shrublands to crop production 2.0 | = crediting period<br>5 - 40 years                                                                     | Risk assessment via an ACR tool<br>% of credits issued goes to a buffer pool   | Default value of 20% market leakage                                                                                            |
|    |    | Soil Enrichment Protocol v 1.1                                         | 100 years: credits issued ex-ante.<br>If less: credits are 1% of the tCO2e stored/year. Issued ex-post | Risk rating<br>% of credits issued goes to a buffer pool                       | Accounts for displacement of livestock and decline in crop yields (>5%).                                                       |
|                                                                                    |                                                                                     | Avoided grassland conversion protocol 2.1                              | 100 years after credits issuance.<br>Monitoring and verification period > crediting period             | Risk assessment<br>% of credits issued goes to a buffer pool                   | 20% leakage effect due to displacement of livestock and crop yields reduction                                                  |
|    |    | VM0042 Methodology for Improved Agricultural Land Management v 1.0     | Non-Permanence Risk calculated by the VCS AFOLU Tool                                                   | Risk assessment<br>% of credits issued goes to a buffer pool                   | Extra manure-C (12% of the manure-C) + productivity decline (>5%) + displacement of livestock (emissions as if steady number). |
|    |    | Nori Croplands Methodology, v 1.3                                      | 10 years                                                                                               | <b>X</b>                                                                       | "Verification will establish if SOC stock gains result in losses outside of project boundary"                                  |
|   |   | Quantification Protocol For Conservation Cropping Version: 1.0         | 20 years                                                                                               | discount factors = 7.5 - 20% of credits (if <10% of the area, not considered). | Based on ISO 14064:2, activity shift deemed minimal                                                                            |
|  |  | Methodology Determination 2021                                         | 100 years<br>Or 25 years with 20% discount on credits issued                                           | Buffer:<br>5% if 100-year permanence<br>25% if 25-year permanence              | The Regulator notifies the project for non-genuine carbon abatement                                                            |
|  |  | Proposal of regulation for the certification of carbon removals        | Long-term storage<br>=monitoring period                                                                | ? Mention "discounting, buffers, insurances..."                                | "the carbon captured should outweigh the emissions that can be caused by carbon leakage" ?                                     |

# Lessons learned

- To measure C removals in the soil it is necessary to find a balance between:
  - Reliable measurements
  - Technical feasibility
  - Affordability
- Carbon accounting methodologies are heterogeneous and this condition poses compatibility issues
- Most of extra-EU carbon accounting initiatives apply a field-based baseline, while the EU seems to look at a regionalized approach which poses serious difficulties in justifying additionality
- Some extra-EU carbon accounting initiatives focuses on land use change practices while others focus on carbon farming practices. Both approaches have to account for important uncertainties + structural carbon accounting risks --> uncertain approach to climate change mitigation
- Need to guarantee the soil C stocks stables in the long term. Most of extra-EU initiatives define a long permanence time among 10 and 100 years while in EU it is not defined.
- Highly complex methodologies + bureaucratic burdens -->
  - advisors (high cost for farmers)
  - aggregations
  - Opens-access knowledge sharing
- Risk of greenwashing if single practice. Need for a wider agroecological approach.

# New role of CREA



Senato della Repubblica

Proposta di modifica n. 45.6 (testo 2) al DDL n. 564

**Approvato**

Dopo il comma 2, aggiungere i seguenti:

«2-*bis*.Al fine di valorizzare le pratiche di gestione agricole e forestali sostenibili, in grado di migliorare le capacità di assorbimento del carbonio atmosferico, e aggiuntive rispetto a quelle prescritte dalla normativa unionale e nazionale in materia di conduzione delle superfici agricole e forestali, è istituito, presso il Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria CREA, il Registro pubblico dei crediti di carbonio generati su base volontaria dal settore agroforestale nazionale, di seguito denominato "Registro". I crediti di cui al presente comma sono utilizzabili nell'ambito di un mercato volontario nazionale, in coerenza con le disposizioni relative al Registro nazionale dei serbatoi di carbonio agro-forestali di cui al decreto del Ministro dell'ambiente e della tutela del territorio e del mare, di concerto con il Ministro delle politiche agricole, alimentari e forestali del 1aprile 2008.

Thank you for your attention!



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