Fitting Carbon Farming to agriculture economic and geochemical realities

07/03/2024

Edouard Lanckriet – AGROSOLUTIONS
elanckriet@agrosolutions.com

AGROSOLUTIONS Consulting

Consultancy company specialized in environmental transition of agriculture

Agronomy

Since 40 yrs. :

- Technical agronomy center for the > 200 French cooperatives of InVivo
- Field trials monitoring

Environmental impact of agriculture

Development of methodologies and tools to measure environmental impact of agriculture / monitor transition

Biodiversity

Water

Soil

Carbon

Low-carbon transition of agriculture

Carbon farming

Pilot projects (France since 2012, Brazil)

Drafting of MRV methods

Creation of MRV digital tools

Training & knowledge diffusion

> 1500 farm monitored since 2022

Economic model

Scope 3 strategy and monitoring

SBTi FLAG compliance / Strategy

Transition planning

LCA Tools

Climate change adaptation

In MARVIC EU Project: WP1 leader

MARVIC Project, an EU Soil Project, is developing a framework for the design of harmonized, context-specific MRV systems for carbon removals by agricultural activities, to propose solutions to implement the CRCF in Europe.

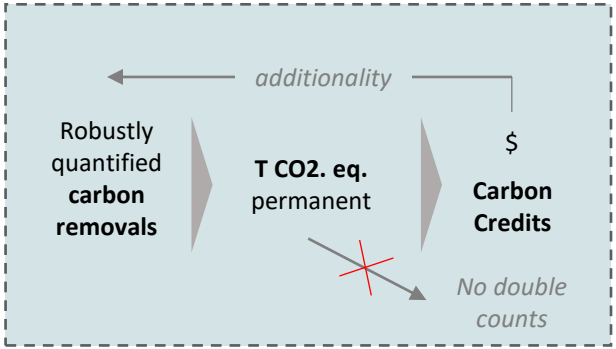
AGROSOLUTIONS is leader of WP1, with ILVO, that focuses on the rules, guidelines and quality criteria.

https://www.project-marvic.eu/

Carbon farming as a lever to finance agricultural transition, a demanding political ambition

In Europe, one of the political objectives of carbon farming is to channel voluntary carbon finance to finance the low-carbon transition of agriculture

This implies creating a framework making the link between agricultural rules and economy, and voluntary carbon finance rules. Making it work is about **aligning rules between agriculture and VCM**.



To work, this system must accomplish a twofold objective:

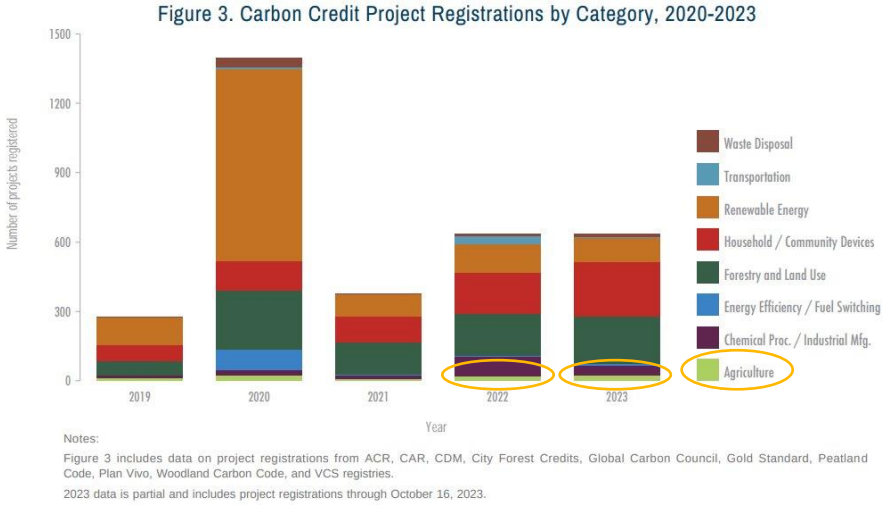
- **Create confidence** in the market that buys the credits / play by its rules
- **Be acceptable to the famers** and to the agricultural world, soluble in its economic and administrative functioning, in its rules…

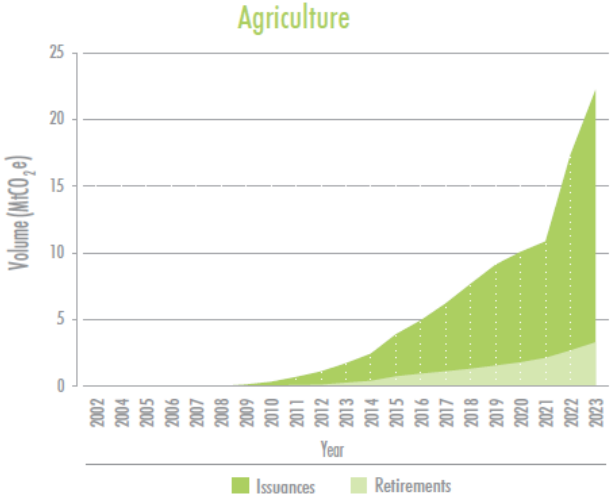
If we make the climate transition of agriculture rely on such a system the task is heavy with responsibility, we must be serious and ensure that it works... Or we need to adapt the system before it is too late

So, where are we ?

Carbon Farming market seems to be taking off

Market reports are optimistic





- Agriculture projects still represent a small share of the projects, but experience a fast growth… (yoy +283% volumes // 14% prices 11$/ton)
- Real share of SOC CF ? Total 2022 : 11 projects in agriculture, mainly driven by grassland and rangelands projects..

Source of the figures: Ecosystem Marketplace, 2023

In France the take-off seems a bit long…

- Sales volumes are not taking off fast enough for removal CF projects
- Exchange prices (33 € per carbon credit avg. price) are considered as:
  - very high by the market
  - not enough to really interest farmers
  - Some transactions are done but we can't talk about "market volumes"
  - 4 years from the launch of the 1st SOC CF method, farmers are losing interest in carbon farming
    - Prices are not attractive enough
    - Too many administrative constraints in CF,
- Because they fear double counts risks with their corporate scope 3 reporting, agrofood companies tend to exclude their farmers to carbon credit programs

CF CO2 abatement cost measured in France

Result of a 3 year project (2019-22) based on 100 farms in the East region France – sample of 31 farms (industrial crops)

Practice changes *(% of the 31 farms that has chosen the practice)*

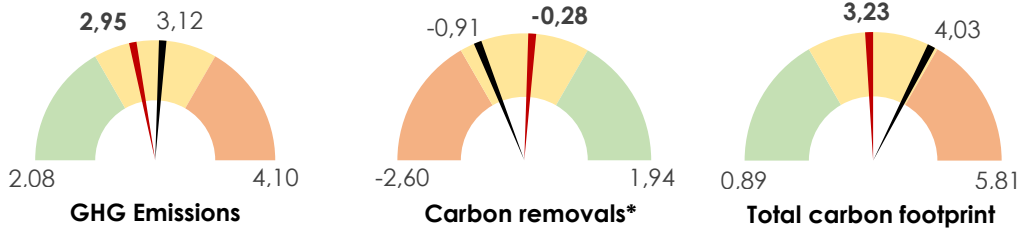
- **Reduce N fertilization** — *22% of the farms*
- **Swith to N inhibitors fertilizers** — *16% of the farms*
- **Reduce volatilisation through fertilzers bury** — *56% of the farms*
- **Introduce new « low-fertilized » crops in the rotation.** — *50% of the farms*
- **Increase leguminous share in cover crops** — *22% of the farms*
- **Increase intercrops biomass** — *63% of the farms*
- **Increase the share of intercorps cultivated with cover crops** — *44% of the farms*
- **Increase organic fertilization** — *16% of the farms*
- **Increase biomass residues** — *25% of the farms*
- **Reduce fuel consumption** — *13% of the farms*

Impact on the carbon footprint

(T CO2 eq / Ha / yr – 5 year simulation)

Baseline

Project Simulation



Economics

Averages on the 31 farms

Project cost *(Farmer costs only)*	**50,3 €/ha/an (avg.)** *[min 3,4 ; max 236,4]*
Avg carbon credits yield	**0,66 credits/ha/an**
Avg cost of carbon credits	**87,1 €/ T eq. CO2** *[min 7,4 ; max 314]*

*Negative value means that soil were net carbon emitters, as the majority of french cultivated soils. CF practice changes helped to reduce average soil emissions and in some cases turned soils into net carbon sinks.

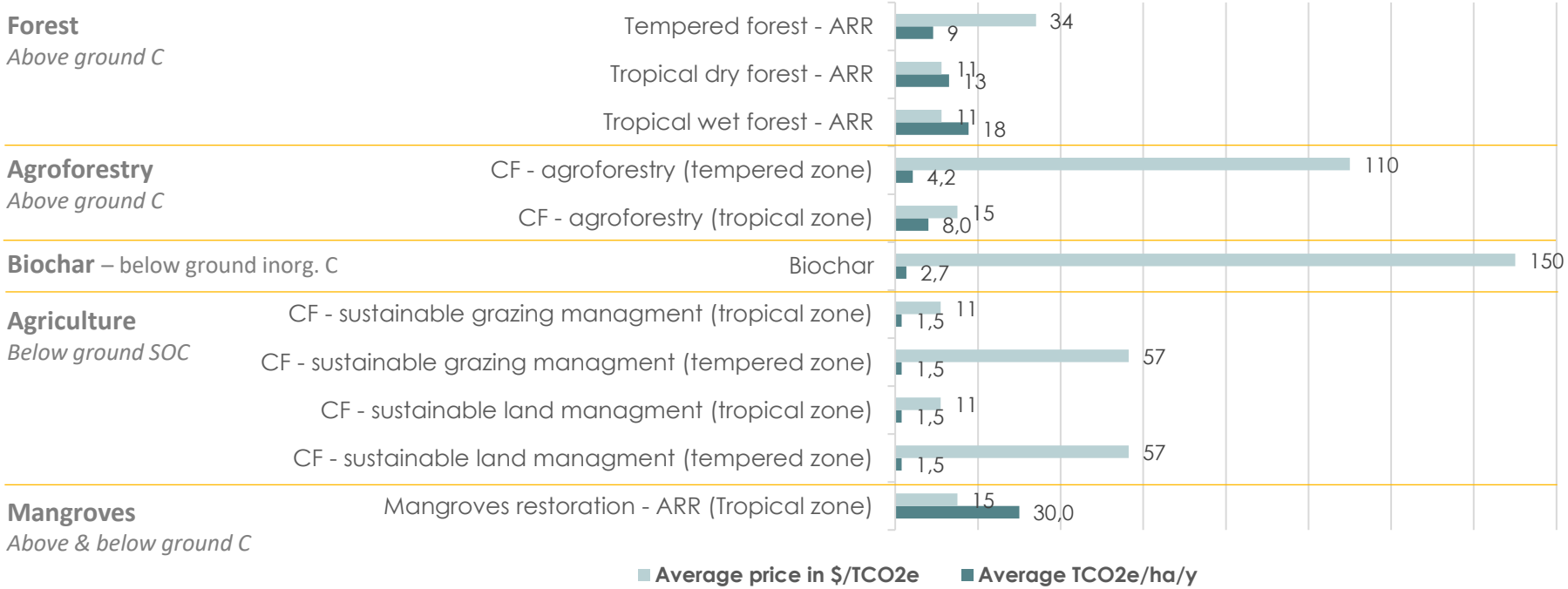
CF projects economics hampered by the absence of economies of scale… especially for SOC CF projects

Project costs	Limited economies of scale
Practice changes at the farm level	• Specific farm by farm. • Machinery investments farm by farm
MRV (Tier 3) • Model setting • Baselines (specific baselines)	• Model to be set with farm soil specific conditions • 1 baseline per homogeneous “units” of removal regime (type of soil x crop rotation x farming practices) ==> sometimes up to 7 different types of baselines per farm (3 in avg.) • Models still rely on ground data, specific at farm or plot level, that can’t be obtained from EO systems
Administrative costs	• PDD specified at farm level, even on collective projects • Huge amount of administrative document to gather to prove data authenticity / time consuming

> 1 500 carbon farming diagnosis performed in France
(baselines /Project lines / Cost assessment)

- **Min. 100 € / Carbon credit** needed to launch ag low carbon transition at scale in France
- For some projects, **entry price possible around 40 – 50 €** but **not representative** of the average situation
- Avg. price of 11 $/credit in international markets for « agricultural » credits.

SOC Carbon Farming compete with NBS projects that yield more carbon credits and can reach economies of scales



Sources:

- *VERRA Registry: https://registry.verra.org/app/search/VCS/All%20Projects*
- *INFCC Compensation carbone: https://www.info-compensation-carbone.com/wp-content/uploads/2023/10/Etat-des-lieux-InfoCC-2023.pdf*
- *Costs and Carbon Benefits of Mangrove Conservation and Restoration : https://www.sciencedirect.com/science/article/abs/pii/S0921800919318154*
- *WWF : https://www.wwf.fr/sites/default/files/doc-2023-01/20211028_Rapport_Analyse-projets-forestiers-label-bas-carbone_WWF.pdf*

Securing CF finance : a harmonized approach on quality criteria is needed

To date, carbon credits are not expensive enough to finance by themselves the low-carbon transition of agriculture.

Fortunately, carbon credit price is rising in VCM, especially for NBS credits.
To secure this finance source, CF credits needs to guarantee their high-quality by complying with “quality criteria” : additionality, permanence and the absence of double counting (non exhaustive).

However, there is persistent criticism from NGOs and the scientific community on the permanence nature of biogenically stored carbon, in addition to that, agriculture has the reputation to be at high risk of multiple countings.

It is all the more crucial to clarify the way CF can robustly satisfy those quality criteria; This needs to be done within a comprehensive and harmonized framework as the low-carbon transition in agriculture is at the crossroads of several financing frameworks: public subsidies, carbon credits and grain premiums paid by companies committed to SBT targets.

Double counts

The lack of clarity / international alignment does not help to finance CF

Double counts between national inventories and offset carbon credits

Not allowed by international standards (GHGP LS&R)

Countries or group of countries that report in their national inventory all removals certified in their territory > **contribution** carbon credits

- EU CF credits (or certificates) can not be sold on the Net 0 market (vast majority of the VCM)
- EU CF credits (or certificates) can be sold on the contribution market

Double counts between corporate reporting and national inventories

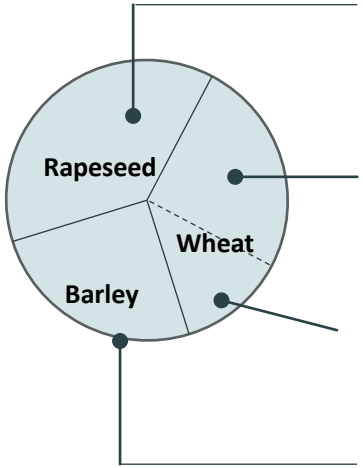
Allowed by international standards (GHGP LS&R) (inevitable)

- EU CF credits (or certificates) can be financed by the companies engaged in SBTI FLAG objectives, to report their progress, if produced on lands located on their scope 3 (in France it concerns < 18% of agricultural lands). Credits used for scope 3 reporting can not be sold as offset credits.

- What is the **value of a contribution claim** vs. a compensation offset credit ?
- **Will FLAG corporate reporting be enough** to finance the cost of low-c transition of agriculture (15% of crops concerned in France)?
- The **lack of clarity on the contribution paradigm** (that should normally be the rule since Paris Agreement) does not help to reassure the market and delays investments to finance the transition.
- **Europe can help** by anticipating those issues in its comprehensive and harmonized framework (CRCF + CSRD + Green Claims)

Agricultural transition will be financed from multiple sources, among which CF ➔ clear and harmonized rules are needed

Crop rotation



Clients

Company A
- *Committed to SBT objectives on GHG reduction*
- *No commitment on removals*

Company B
- *Committed to SBT objectives on GHG reduction and removals*

Export / international markets
- No commitment

Company C
- *Not committed*

Source of finance for the transition
Can be cumulated as long as there is no double counts

- **Grain premium** for measured GHG emission reduction
- Removals associated to rapeseed can be sold as **carbon credit**
  - Offset credit if the state does not account in its nat. inventory
  - Contrib. claim if the state reports in its nat. inventory

- **Grain premium** for measured GHG and removals (but only removals linked to the share of wheat bought by the company)

- No premium
- GHG Emission reduction and removals can be sold as **carbon credits**
  - Offset credit if the state does not account in its nat. inventory
  - Contrib. claim if the state reports in its nat. inventory

- **Public subsidies** (as long as it does not interfere with additionality of the private finance of either SBT objective or carbon credits)

Combine all available sources of financing (carbon credits and grain premiums) is necessary, because to date no single source of financing is sufficient.

We are creating such programs with French cooperatives

Agricultural transition will be financed from multiple sources, among which CF ➔ clear and harmonized rules are needed

For farms that are embarking on a low-carbon transition across their entire perimeter,
What does this business model technically imply ?

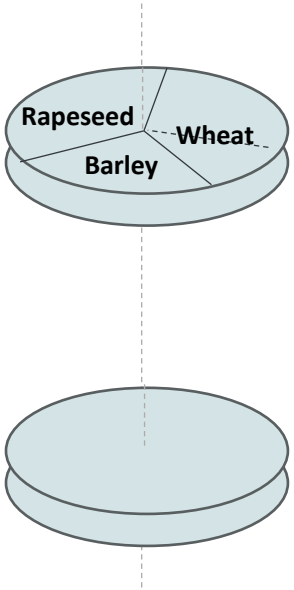
1 - Commit a farm to a low-carbon transition covering its entire perimeter,

2 - calculate GHG and removals separately,

3 - Allocate results crop by crop

Low-carbon transition in agriculture will most likely be financed by multiple sources that will evolve with time.

We need comprehensive and harmonized rules to secure the economic model.



GHG emission reduction

Calculated crop by crop, or at farm scale and allocated by crop

Carbon removal Above & Below ground

Calculated at farm scale, on multiple year base, and allocated by crop

Economic model

Shares evolve every year with crop contracts

GHG Carbon credit

+

Direct corporate claim

+

Removal Carbon credit

+

Public subsidies

Can be cumulated as long as there is no double counts

Permanence

An appropriate quality criteria for carbon farming ?

Biogenically stored carbon is not permanent

Adjustments brought by international CF frameworks in their monitoring rules may reassure the markets, but:

- It does not change anything to the reality : CF removals are not permanent
- It increases the administrative burden of the MRV for the farmer, and the cost structure of CF credits.

Carbon Farming financing through VCM is at risk as long as carbon finance does not officially changes its demand on permanence.

Carbon farming financing should be addressed by a framework suited to non permanent and constantly evolving carbon pools.

Permanence

An appropriate quality criteria for carbon farming ?

There is no debate on the importance of recharging soils with organic carbon, replanting hedgerows and developing agroforestry.

All these carbon farming practices are beneficial for the climate, generate immense co-benefits on biodiversity, soils and water, and are among the best levers to adapt agriculture to climate change (soils richer in organic carbon are more resilient to the intensification of climatic events, floods, droughts, sudden variations and high temperature amplitudes).

Is “ permanent T. eq. CO2” a unit adapted to account for climate benefit of carbon farming ? Does it appropriately capture the climate benefits of carbon farming ?

Aren't we trapping ourselves in wanting to have those practices financed by a framework that remunerates performance on the basis of a single unit of measurement (the permanent T. eq. CO2).

The objective is not to criticize the current system or to stop its integration of agriculture,

The objective is not to underestimate the risk that the current debates on permanence pose for the future financing of the agricultural transition if we rely on this system : current VCM is just not designed to finance non-permanently stored carbon.

Given the stakes we cannot afford not to think about a plan B if ever this system rejects agriculture

Permanence

An appropriate quality criteria for carbon farming ?

Alternative approaches to measure climate impact of carbon farming

Benefit tackled	Appropriate unit	Link to carbon credit	Consequences	
Non permanent carbon removals	T.CO2.year	To be translated into carbon credit ➔ need of a common standard on time duration of "permanence" ↗ 100 yrs. ? ↘ 5000 yrs. ?	Less carbon credits produced at the beginning of the project, when money is needed to finance the transition	It won't help to secure the economic model of carbon farming if CF credits are sold in an open VCM
	Radiative forcing (W/sq. m)	In progress through scientific studies	Capturing all benefits of carbon farming on climate. According to some studies the albedo effect due to CF practices could be more important than the effect of sequestered carbon	
Albedo change	Radiative forcing (W/sq. m)			

Fields of research of Jens Leifeld and Flora Desmet, Agroscope ; Eric Ceschia, Cesbio – INRAE, collaborators of MARVIC Project

Conclusion

Through the harmonization of mechanisms such as the CRCF, the CSRD, the Green Claims, and tomorrow perhaps a mechanism dedicated to agriculture, Europe has the power to design a coherent, harmonized and effective framework to finance the transition of agriculture that we still miss !

The European initiative can inspire the rest of the world because for the moment no one has found the solution to sustainably finance the ecological function of agriculture,

and it is urgently needed all around the planet.

Let’s take action !