

BROCHURE - EVALUATION OF THE APPLICATION POTENTIAL OF IT TOOLS **ACTION A.6 task 1**

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Description of Action A6 task 1 - Goals and Expected results

Action A6 task I aims to review a selection of existing IT Tools for farm management in order to assess their potential and gaps in the application of Carbon Farming practices. These tools, mainly represented by commercial software but also by modelling software developed within european research projects, are basically conceived as Decision Support Systems (DSS) and support systems for the crops and farm management.

The main goals and expected results of action A6 task 1 include:

- Selection and analysis of the state-of-the-art of IT Tools that can support and influence mitigation practices and in particular Carbon Farming practices
- Analysis of the main features of each tool in particular the aspects related to Carbon Farming practices
- Provision of a database of IT Tools and drafting of a classification to facilitate user search and consultation
- Identification of potentialities/gaps and applicability in the europaen context

The output of this actions is:

• A **public web repository** of selected IT Tools that all users/farmers can access; this includes the description of the tools main features, list and description of identified utilities and gaps related to the carbon cycle assessment.

This action supports the increase in the knowledge of the state of the art of tools that could raise awareness and influence the adoption of mitigation practices; the identification of the gaps in the existing instruments could guide further development and improvement of ad-hoc tools and give a contribution for their adoption.















2. Methodology

A **systematic review of the scientific literature** has been conducted aimed at identifying existing IT Tools for farm management.

- A web search was performed by using a combination of **keywords** both on the main online portals such as 'Google Scholar, ScienceDaily, ScienceDirect ' and by free search
- Online tools, commercial softwares, models derived from research projects and mobile **apps** have been included in the online search; regarding the tools dedicated to LCS (Life Cycle Assessment), only the main ones found in the literature were considered

In order to organise and harmonise the identified tools dataset, a **database** has been designed, consisting of **two main tables** that are linked to each other through the **key field "Name"**:

- A more general table named "Management for sustainability of agricultural landscapes" including all the identified tools
- A more specific table named "**Carbon management**" including only the tools considered more relevant to the carbon management in agriculture

In order to group and make the analysis of the tools more effective, a **classification** of the tools into **10 categories and appropriate sub-categories**, based on the features provided, was performed. For the definition of the classes, the various classification systems found in the literature were taken into consideration, harmonising and modifying them to make them suitable for our purpose.

For the most relevant tools to the carbon management in agriculture, **a further classification in three classes** (low, medium, hight) was carried out, related to the **level of relevance to Carbon Farming practices**.

In addition to the classifications, in the general table "Management for sustainability of agricultural landscapes", for each tool the following informations were provided: **name**, **link**, **creator/author/provider**, **distribution platform**, **classes of crops involved**, **description and purpose of the tool**, **geographical area of development and use**, **terms of use** and **references**.

For the tools included in the "Carbon management" table, indications were added regarding the **geographical area of or use**, **Carbon Farming practices considered**, **terms of use** and the **possibility to provide a carbon stock evaluation**.













Name 🖌]	Name 🖌		
Creator / Author / Provider		Geographical area of use		
Link		Description		
Platform		Carbon farming practices considered		
Crop classes		Carbon stock evaluation		
Main crops involved		Terms of use		
Theme]	Relevance to carbon farming		
Tool category				
Tool subcategory				
Geographical area of development				
Geographical area of use/test				
Description				
Relevance to carbon management]			
Terms of use]			
Reference]			

Figure 1 - Database structure; left "Management for sustainability of agricultural landscapes" table, right "Carbon management" table















3. Main Results

A total of 116 tools relative to "**Management for sustainability of agricultural landscapes**" have been identified and classified.

It is possible to filter these tools for name, link, creator/author/provider, distribution platform, classes of crops involved, description and purpose of the tool, geographical area of development or use, terms of use and references.

Tool category	Count
Agronomy profitability - Scenario comparisons	3
Carbon accounting	29
Carbon benchmark / LCA	7
Climate change adaptation	5
Education and data management	7
Equipment management	1
Food marketing or ethical and sustainable consumption	4
Information management - Digital recordkeeping / data collection and sharing	4
Input management	49
Mission planning	7
Total	116

 Table 1 - Tool categories for "Management for sustainability of agricultural landscapes" tools

Among them a total of 36 tools more specific to "Carbon management" have been identified.

It is possible to filter these tools for **geographical area of use**, **Carbon Farming practices considered**, **possibility to provide a carbon stock evaluation**, **terms of service**, and **relevance to Carbon Farming**.

16 tools are identified as **highly relevant to Carbon Farming** for farmers, 10 were implemented for the **european area** (3 free and 7 paid services) of which 7 could be used in **Italy** (3 free and 4 paid services).















Figure 2 - Geographical area of development for "Management for sustainability of agricultural landscapes" tools

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Figure 3 - Geographical area of development for "Carbon management" tools

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The public web repository is available for consulting in the download section of the website (<u>https://c-farms.eu/it/news/</u>).

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Name 💌	Geographical area of use 💌	Description 💌	Carbon farming practices considered 🛛 💌	Carbon stock evaluation 💌	Terms of use	Relevance to carbon farming 💌
		Digital platform that uses				
		predictive agronomic forecasts and				
		sustainability metrics generated				
		from field-level data. With this				
		information, improves operational				
		efficiency, generates new revenue				
		streams from sustainability				
		programs and ensures long-term				
		success for future generations.				
		Agrible is connected to a range of				
		programs that reward sustainability	Cover crops, Crop diversification		Paid service (free weather forecasting and	
Agrible	Canada, USA	efforts with more profitability	(rotation), Tillage reduction	YES	record-keeping)	High
		Supports in adopting practices that				
		are good for the farm and helps to				
		get paid for the carbon credits	Cover crops, Crop diversification			
Carbon by Indigo	USA	generated	(rotation), Tillage reduction	YES	Paid service	High
		End to end soil carbon project				
		management software. It's enable				
		you to design and execute the				
		entire life cycle of your soil carbon				
		project in a methodology				
		compliant way enabling you to	Conversion to/from arable land, grass			
		create hight quality verifiable	or forest, Cover crops, Lowland &			
	Australia, Canada, Ireland,	carbon credits ready for	upland peatland carbon management,			
Carbon Count	USA	tokenization or trade	Residue management, Tillage reduction	YES	Paid service	High
		Full greenhouse gas assessment for				
		CO2, CH4, and N2O, from all major				
		on-farm emission sources (and CO2				
		removal into biomass and soil				
		sinks), including land management				
		of annual and perennial crops,	Conversion to/from arable land, grass or			
		pasture, range and agrotorestry	forest, Cover crops, Crop diversification			
001157 5		systems, as well as emissions from	(rotation), Residue management,			
COMET-Farm	USA	livestock and on-farm energy use	lillage reduction	YES	Free	High
		ivianaging cost, productivity and			The factor of the last sector of	
		soll nealth for farmers. The tool can	Conversion to (from eaching low)		Free for farmers; Supply chain and retail	
		snow now management decisions	Conversion to/from arable land, grass or		businesses require Alliance membership to	
Cool Form Tool		sequester carbon or reduce	Torest, cover crops, Residue	VEC	use the root directly, or via their supply	1 U.s.h
COOLFarm 1001	wondwide	greennouse gas emissions	management, image reduction	165	chains.	nign
		farmore and growers includes in				
		larmers and growers; includes in				

Figure 4 - public web repository example











4. Final Recommendations

The search for existing IT Tools ended in January 2023, any tool available after this date is not included in the web repository.

The data populating the database are taken from simulations carried out with the tools; in the case of fee-based tools, which cannot be tested directly, the information was taken from the supplier's website; in the case of tools describing prototypes created within research projects, the information was taken from the scientific literature, where available.

The research showed that there are few free IT Tools with high relevance to Carbon Farming practices, made for the european area and available to european farmers, none of them made in Italy and specific to our country.













The **project C-FARMs**, **co-funded by the 2020 LIFE Programme of the European Commission**, supports the design and implementation of targeted payments for the application of Carbon Farming practices through the development of a **regulatory framework for the certification of Carbon removals** (or Carbon non-emissions) based on a robust and transparent carbon accounting scheme **in connection with the national GHG inventory.**

Objectives of the Project:

- 1. Creating a **high-resolution demonstrative geospatial information system** (GIS-FARMs), which will identify the mitigation potential of the agricultural sector of Lombardy region
- 2. **Systematising existing knowledge and data** with relevance for the area of interest useful for the creation of the high-resolution demonstrative geospatial information system (GIS-FARMs)
- 3. Identifying information and research gaps
- 4. **Supporting the development of a regulatory framework for a carbon certification system** in collaboration with relevant actors and institutions
- 5. **Exploring the possibility of use of common methods and/or reference data and/or data sets** in combination with GHG reporting institutions as well as an exchange and information mechanism related to greenhouse gas inventories from the agricultural sector
- 6. **Supporting the design and implementation of targeted payments** for the application of Carbon Farming practice

The project aims to work in close connection with:

- the Institutions with the official responsibilities of GHG reporting
- the offices from Regional authorities dealing with agricultural themes (e.g. CAP payments)
- the Institutions dealing with the certification systems

C-FARMs also involves **public Institutions**, **Universities and research centres**, **private companies and farmer and woodworking industry associations** working specifically on themes related to the **LULUCF sector** (Land-use, Landuse change and Forestry)











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