



**EJP SOIL**  
European Joint Programme

## Roadmap for carbon farming schemes

**Road4Schemes**

**Deliverable 1.4**

**Carbon farming schemes at glance: Report with  
infographics**

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## List of acronyms and abbreviations

Common agricultural policy (CAP)

Carbon dioxide (CO<sub>2</sub>)

Carbon farming (CF)

Carbon Schemes Inventory (C.S.I)

Emissions Trading System (ETS)

European Union (EU)

Greenhouse gas (GHG)

Land use, land use change and forestry (LULUCF)

Member State (MS)

Monitoring, Reporting and Verification (MRV)

Nitrous oxide (N<sub>2</sub>O)

Soil carbon sequestration (SCS)

Soil organic carbon (SOC)

Voluntary carbon market (VCM)

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## 1. Introduction

In the current global scenario, where sustainable management of the environment and agriculture have become priorities, and awareness of climate change and the reduction of greenhouse gas (GHG) emissions is steadily increasing, the concept of carbon farming (CF) has gained significant attention from European and national policies, the research community and the private sector (including agricultural entrepreneurs, certification bodies, etc.). The term 'carbon farming' refers to sustainable agricultural practices and land-use strategies that sequester atmospheric carbon dioxide (CO<sub>2</sub>) in soil and plant biomass above and below ground (i.e., carbon removals, CR) or reduce GHG emissions. Some of these practices include minimal or no-tillage, use of cover crops, application of organic fertilisers, incorporation of agricultural residues into the soil, agroforestry, reduction of chemical fertilisers and sustainable forest management.

These practices help mitigating climate change and provide other ecosystem services that benefit the community, such as reducing water, soil and air pollution and increasing biodiversity, and individual land managers, such as reducing erosion and increasing soil fertility. The European Union (EU) has long recognized these ecosystem services by funding them through the Common Agricultural Policy (CAP). Alongside CAP funding, new forms of private funding have recently emerged, such as voluntary carbon removals certification schemes. Unlike CAP subsidies, whose fundamental objective is to make agriculture more sustainable, CR certification schemes are designed to offset unavoidable emissions generated by sectors referred to in the Effort Sharing Regulation (Reg. EU n. 2018/842)<sup>1</sup>, that are agriculture, transport, buildings and small industry. The different objectives of these policy instruments require a transparent and robust parallel management system. Indeed, voluntary certification schemes can generate tangible benefits because they are open to all land managers, not just farmers, as it is the case for the CAP. In essence, all parties excluded from CAP funding could benefit from these forms of financing and contribute to more sustainable land management together with farmers. In addition, CAP measures that are not eligible for funding by the CAP itself, due to budgetary constraints, could be financed.

In recent years, Europe has seen the emergence of several voluntary carbon removals certification experiences with the common goal of incentivising actions and practices that contribute to reducing GHG emissions or sequestering atmospheric carbon. However, in the absence of a common regulatory framework, the market for agricultural carbon credits has struggled to take off. Hence the European Commission's has made a proposal for a regulation on the certification of carbon removals (COM(2022) 672 final)<sup>2</sup>, which, in anticipation of its approval, emphasises the need to organise existing initiatives and create a common voluntary carbon market in Europe, building on existing good practices.

To facilitate collaboration, information sharing and transparency in this sector, the Carbon Schemes Inventory (C.S.I) web platform was developed and is accessible at <http://reports.crea.gov.it/powerbi/CarbonSchemesInventory.html> based on the data collected by the Road4schemes project about 156 different initiatives existing in Europe and 6 extra-EU relevant initiatives and made available in the project's internal database developed by the WP2. The database

<sup>1</sup> <https://eur-lex.europa.eu/eli/reg/2023/857/oj>

<sup>2</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52022PC0672>

is populated with information describing the CR certification schemes mentioned above, based on public sources (websites, reports, etc) as well as direct interaction with reference people for the scheme. The project aimed to create a heterogeneous database with a reliable and representative set of carbon farming schemes, covering different regions and agricultural sectors, containing result- and action-based schemes as well as hybrid schemes, with both successful and failed schemes and both implemented, concept-phase and pilot projects schemes.

This deliverable focuses on the analysis of the inventory results shown on the C.S.I. web platform. The aim is to examine data on carbon farming schemes, create infographics summarising key findings and describe the most significant results in a clear and accessible manner. This report will contribute to the dissemination phase of the project results, which ensures that the insights gained from C.S.I. are effectively communicated to a wide audience. This approach has the aim to help disseminating the information contained in the C.S.I., promoting better understanding and wider adoption of CF practices. By making Road4schmes data more accessible and engaging, we aim to support the development of more sustainable farming systems and improve climate resilience.

## 2. Description of the C.S.I. Platform

In the context described above, the idea of developing a web platform emerged. The C.S.I. Platform is an online resource dedicated to providing detailed information on existing carbon removals certification schemes in Europe and, at a lower extent, worldwide. The platform draws its data from the inventory developed in 2022 in the context of the WP2 of Road4Schemes.

The tool was developed thanks to the collaboration of the research groups of CREA Research Center for Agricultural Policies and Bioeconomy based in Rome and Pescara (Italy). Fig. 1 shows a screenshot of the platform's main interface with the 162 identified carbon removals certification schemes globally, of which 156 in Europe.

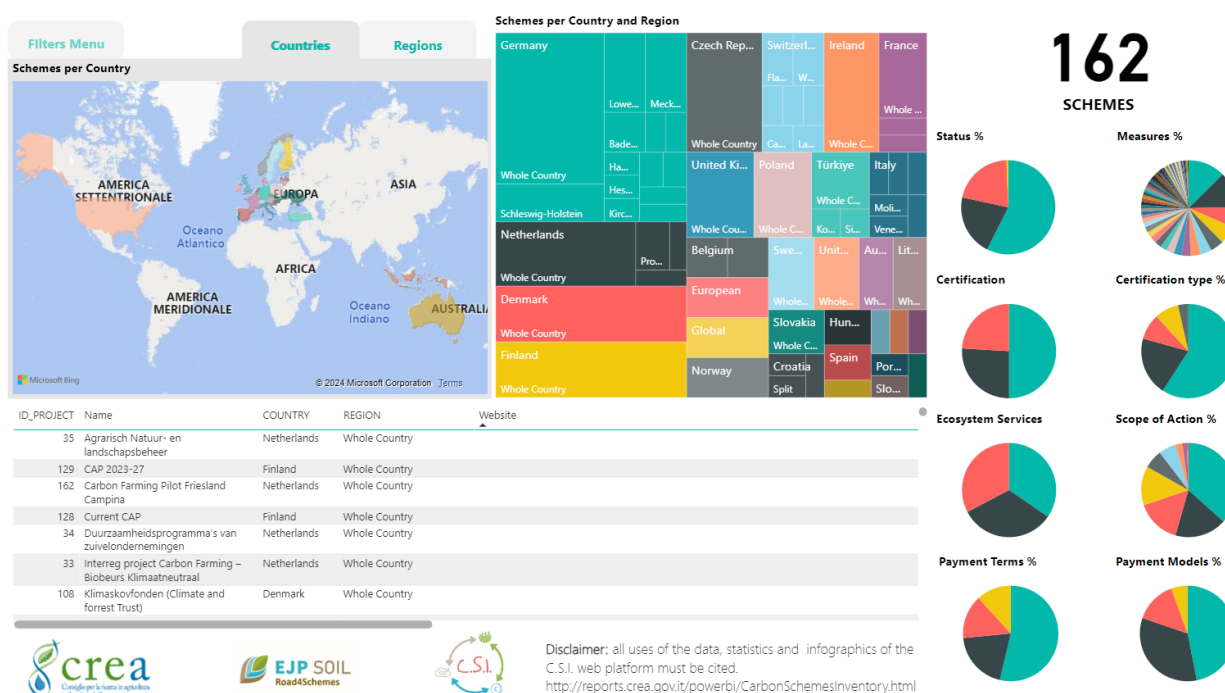


Figure 1 Main graphic interface of the C.S.I., once the user accesses the platform via the <http://reports.crea.gov.it/powerbi/CarbonSchemesInventory.html>.

The C.S.I. platform has a filtered search functionality (Fig. 2) that allows users to optimise their search by entering specific criteria to obtain targeted information in a short time (Fig. 3). Users are allowed to select patterns and combine different filter options based on:

- geographical location,
- payment terms (action-based, result-based or hybrid),
- scheme status (whether it is in the conception phase, has been discontinued or is implemented)
- type of payment (by private, public or mixed actors)
- issuance of some type of certification upon project implementation (certificate, credit, label or other type of document)
- scope of action (agro-forestry, biochar, full agricultural schemes, forestry, cropland, grassland or peatland)



- type of eligible agro-forestry measures (afforestation, catch crops and cover crops, manure and compost, peatland management, organic or regenerative farming, pasture management, etc.).

Thanks to this functionality, users can quickly access the information most relevant to their needs by quickly comparing data on all schemes on a national, European and international basis, down to information at the individual scheme level.

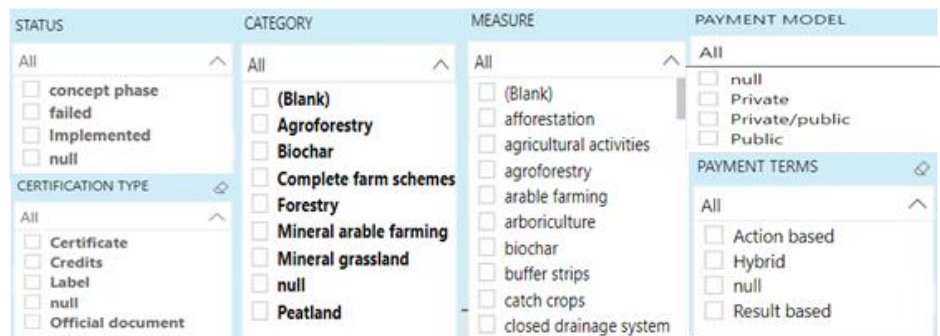


Figure 2 Detail of the filtering functionality for searching carbon schemes patterns in the C.S.I. platform.

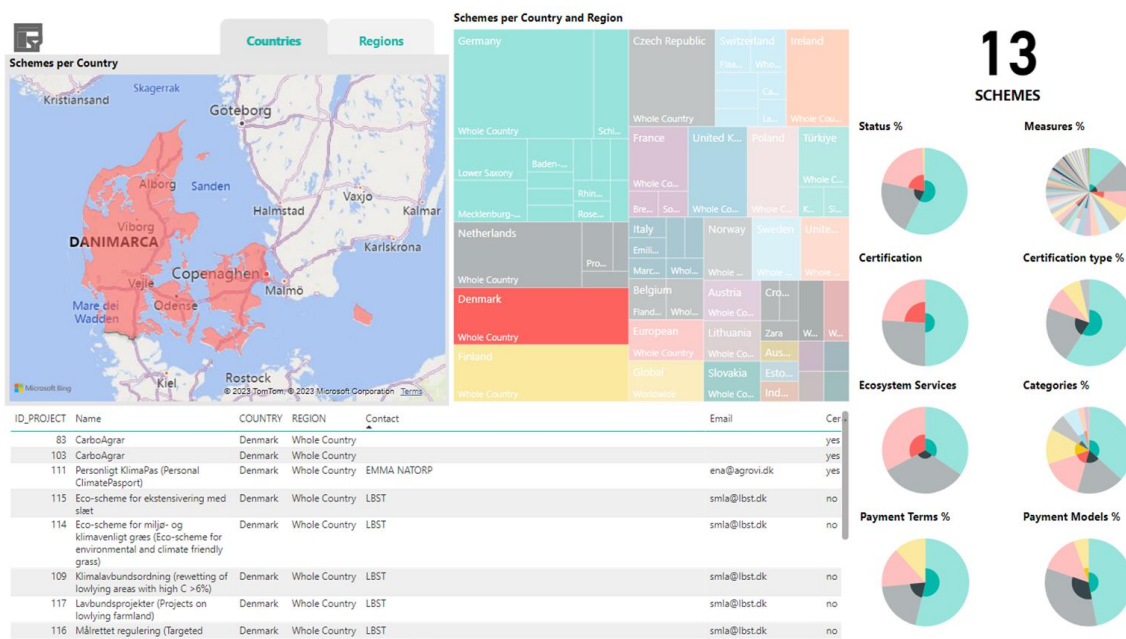


Figure 3 C.S.I. interface after selecting a country, in this case Denmark, with its surveyed schemes and reports.

The C.S.I. platform is an invaluable resource that consolidates a wealth of data on carbon schemes in Europe and worldwide, offering a comprehensive and user-friendly interface. To improve the dissemination of the results of this project and ensure that the wealth of information is accessible and engaging to a wide audience, it is essential to produce infographics (see chapter 3). Infographics provide a visually compelling way to present complex data, making it easy for stakeholders to quickly understand and interpret key information. By distilling detailed information into clear and concise visual summaries, infographics can effectively highlight important trends, comparisons and actionable insights. This not only promotes knowledge transfer, but also facilitates informed decision-making among policymakers, researchers and practitioners. The use of infographics will significantly increase the visibility and impact of the C.S.I. platform data, fostering greater engagement and deeper understanding of carbon farming schemes and their potential benefits.

C.S.I. is open source and supports multiple languages, making it accessible to diverse users globally. The tool is designed to meet the needs of three main user groups:

1. **Public Administrations and Policymakers:** Governmental entities can use C.S.I. to monitor the progress of CF projects and certification schemes and identify emerging trends and needs in the sector. The platform offers a customized dashboard and analytical tools, allowing policy institutions to access information collected by a group of experts in the field and use it for their agricultural policy decisions.
2. **Project Developers:** For project developers, C.S.I. is a valuable resource for identifying certification bodies and potential collaborators for their CF initiatives. The advanced search function simplifies the process of finding suitable partners and enables quick and efficient monitoring.
3. **Certification Bodies:** Certification bodies can use the web application to ascertain the presence of other active stakeholders in the carbon farming schemes sector or share information about their activities, promoting transparency and facilitating potential collaborations.

### 3. Summary reports and infographics of the C.S.I. web platform

#### 3.1 Geographic Distribution and Quantification of Carbon Farming Schemes

The Carbon Schemes Inventory (C.S.I.) platform includes data on 156 carbon farming schemes across Europe and three extra-EU countries. Firstly, this extensive database provides a detailed view on how they are geographically distributed.

Within the European Union (EU), the member states represented in the database include Austria, Belgium, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Latvia, Lithuania, the Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, and Sweden. Each of these countries hosts various carbon farming initiatives, contributing to the overall effort to mitigate climate change through sustainable agricultural practices.

In addition to the EU member states, the database also covers several non-EU countries in Europe, including Norway, Switzerland, Turkey, the United Kingdom, and Ukraine. These countries are actively engaged in carbon farming, showcasing a commitment to environmental sustainability beyond the EU borders.

Beyond Europe, the database includes data from other continents, featuring carbon farming schemes in Australia, the United States, and Indonesia. These regions have also recognized the importance of carbon farming and are implementing various practices to sequester carbon and reduce greenhouse gas emissions.

The map in Figure 4 visually represents the distribution and quantification of these schemes. The intensity of the green color on the EU map indicates the number of schemes present in each area; the more intense is the color, the more numerous the carbon farming initiatives.

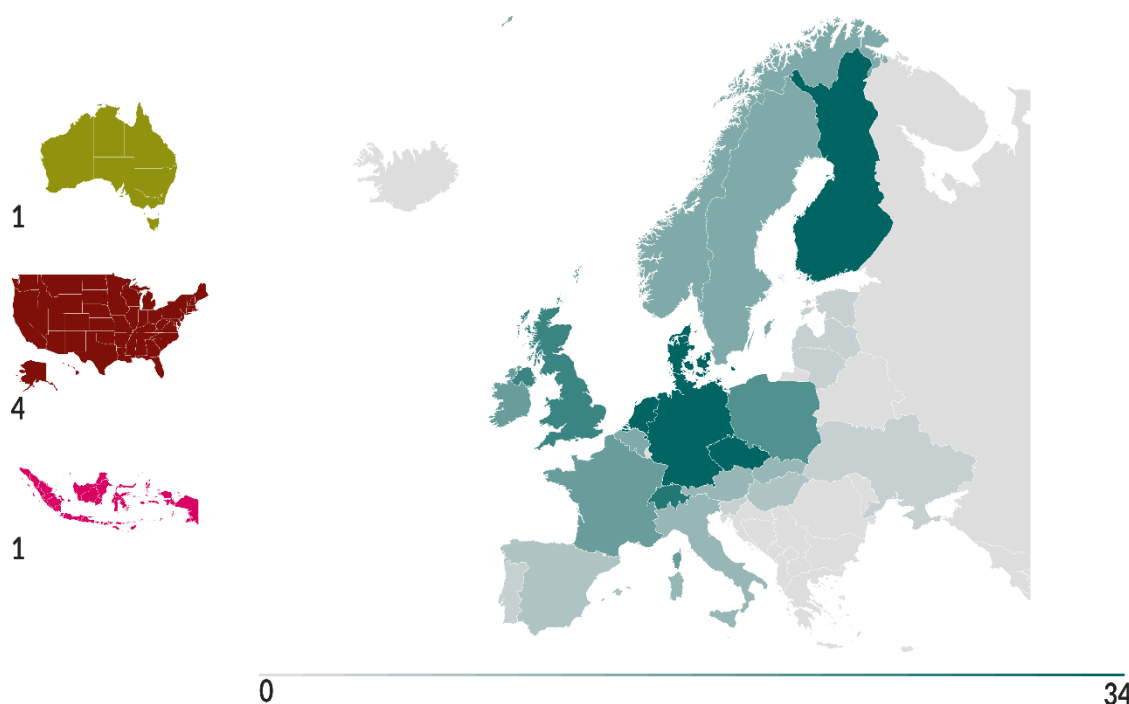


Figure 4 Map of C.S.I. Carbon Farming schemes distribution and density

Moreover, in figure 5, the horizontal bar graph classifies countries according to the number of carbon farming schemes inventoried within the Road4schemes project. This visual representation allows a clearer comparison of the prevalence of these schemes in different countries.

The top countries for the number of existing carbon farming schemes are:

- Germany which leads the ranking with 34 schemes;
- the Netherlands, which ranks second with 15 schemes;
- Finland and Czech Republic each have 13 schemes.

The chart highlights the different levels of adoption and implementation of carbon farming practices across countries, providing indications of regional trends and commitments.

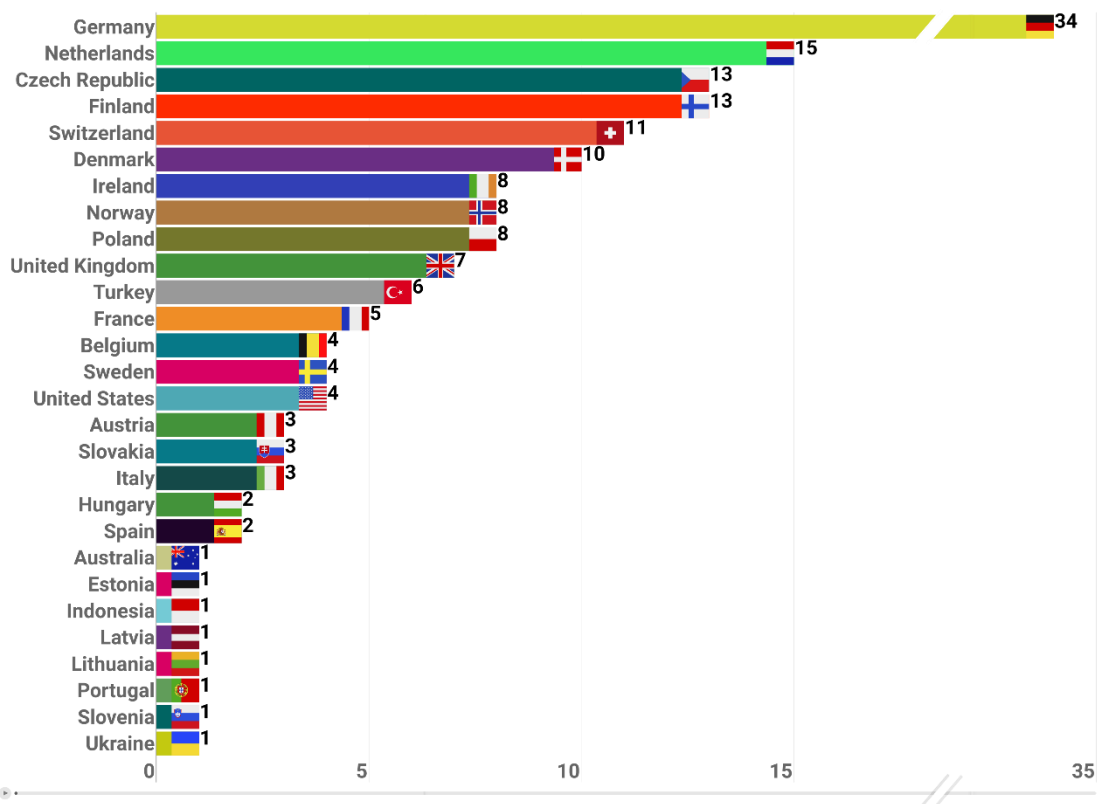


Figure 5 Number of carbon farming schemes per country

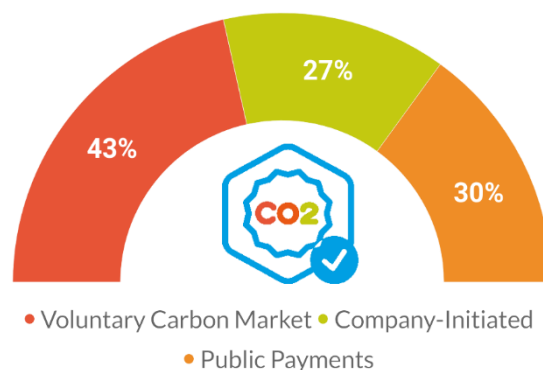
### 3.2 Categories of Carbon Farming Schemes in Europe

A total of 156 carbon farming (CF) schemes in Europe are categorized into three distinct types:

- **Public Payments (PP):** These are schemes where local authorities finance CF projects, providing payments to farmers.
- **Voluntary Carbon Market (VCM):** In these schemes, polluters purchase credits generated by carbon removal activities to offset their emissions.
- **Company-Initiated (CI):** These initiatives are funded by consumers who support carbon removal projects.

Very often mixed schemes exist, combining markets and co-financing instruments (Smit and van der Kolk, 2024). VCMs, which are the most common schemes (43 % of the European CF schemes, (Fig. 6)), are often a lever for company-led initiatives, but for their better functioning, the carbon market requires regulations from outside the emitting company, namely the CRCF quoted in the introduction of the present report (Criscuoli et al., 2024 policy brief available at [https://ejpsoil.eu/fileadmin/projects/ejpsoil/WP8/Policy\\_briefs/EJPSOIL\\_Policy\\_Brief\\_Towards\\_a\\_regulation\\_on\\_carbon\\_removals\\_in\\_the\\_EU.pdf](https://ejpsoil.eu/fileadmin/projects/ejpsoil/WP8/Policy_briefs/EJPSOIL_Policy_Brief_Towards_a_regulation_on_carbon_removals_in_the_EU.pdf)).

## Categories



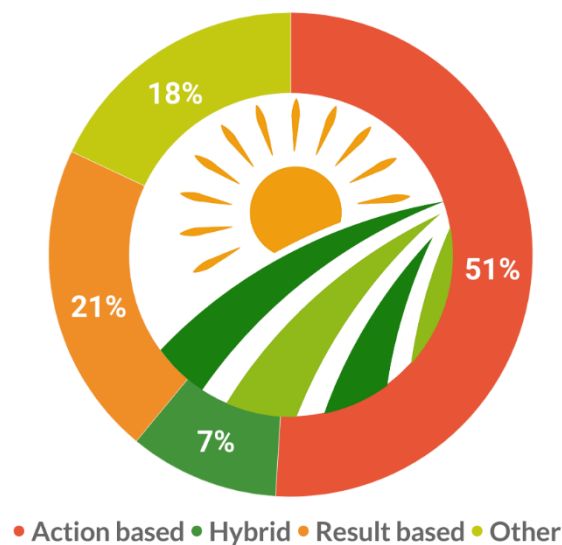
*Figure 6: Distribution of 156 European Carbon Farming schemes by category (Public Payments, Voluntary Carbon Market, and Company-Initiated).*

### 3.3 Payment Terms

The figure 7 illustrates the distribution of payment terms for carbon farming schemes, categorized into four types, which is an essential element to characterize carbon schemes. There are various payment modalities, as shown in the chart, representing different percentages of the surveyed schemes:

1. **Action-Based:** 51% of the schemes apply action-based payment terms, where payments are made based on the implementation of specific actions or practices.
2. **Result-Based:** 21% of the schemes apply result-based payment terms, where payments are made based on the achievement of specific environmental outcomes or results.
3. **Hybrid:** 7% of the schemes apply a hybrid payment approach, combining elements of both action-based and result-based payments.
4. **Other:** 18% of the schemes fall into the 'Other' category, encompassing various alternative payment structures.

## Payment terms



*Figure 7: Distribution of Carbon Farming schemes by payment terms (Action-Based, Hybrid, Result-Based, Other).*

### 3.4 Payment Models

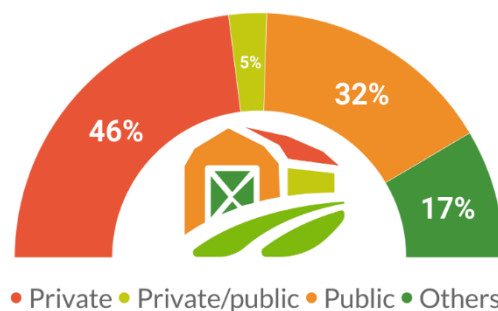
Figure 8 provides an overview of the payment models used in carbon farming schemes, categorizing them into four main types. The most prevalent payment model is the private model, which accounts for 46% of the schemes. In this model, private entities fund carbon farming initiatives, indicating significant investments from the private sector into sustainable agricultural practices.

32% of the schemes are Publicly funded, relying entirely on funds coming from governmental or local authorities. This result demonstrates the important role of public funding in promoting carbon sequestration and emission reduction practices among farmers.

Combined private/public payment model are schemes that benefit from a mix of fundings coming from both private sources and public authorities, showcasing a collaborative effort in supporting carbon farming activities. This mixed payment model represents 17% of the inventoried carbon schemes.

The remaining 5% of the schemes fall into the 'Others' category, indicating alternative or less common payment models.

## Payment models



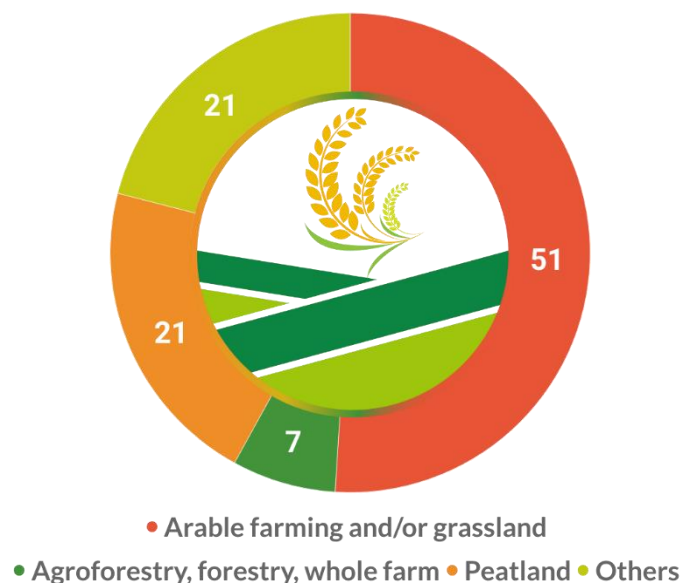
*Figure 8 Distribution of Payment Models for Carbon Farming schemes (Private, Private/Public, Public, Others).*

### 3.5 Land Use

The inventoried schemes by the Road4schemes project were grouped in land use categories. This classification allows us to provide a comprehensive understanding of the sustainable practices involved.

Figure 9 illustrates the distribution of carbon farming schemes according to different land use categories. The most common category, representing 51% of the schemes, is arable farming and/or grassland. This indicates a significant focus on integrating carbon farming practices within traditional agricultural land use. Agroforestry, forestry, and whole farm schemes each represents 7% of the total. These land uses refer to the incorporation of woody species on the land, in the case agroforestry in combination with crops or livestock, and other farming practices to enhance carbon sequestration and improve ecosystem services across the entire farm operations. Peatland schemes also account for 21% of the total schemes, highlighting the importance of managing these carbon-rich ecosystems to prevent carbon losses and support climate mitigation efforts. The remaining 21% fall into the 'Others' category, which includes various other land use practices not covered by the primary categories.

## Land-use



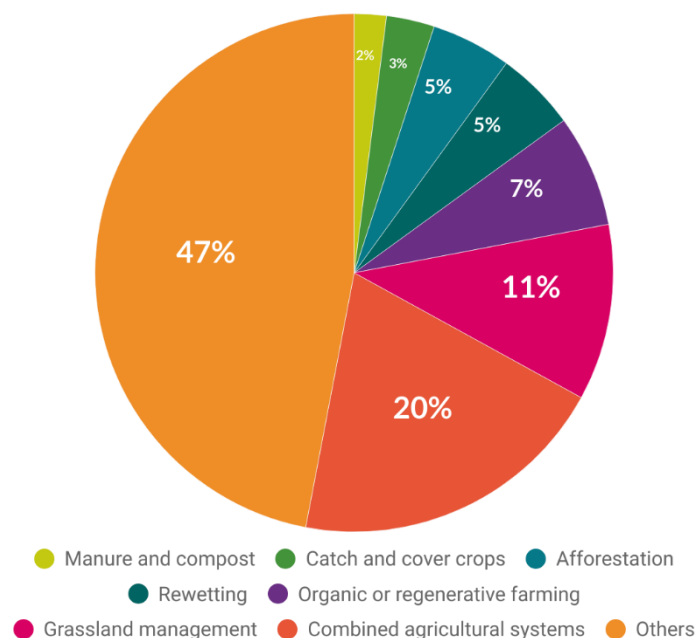
*Figure 9 Distribution of the schemes over different land use categories*



### 3.6 Agricultural measures

The inventoried schemes by the Road4schemes project were grouped also based on the agricultural measures implemented within carbon farming schemes (Figure 10). The largest category, accounting for 47% of the measures, is labeled as "Others," which includes a variety of agricultural practices not included in the other categories. Combined agricultural systems are the second most prevalent, constituting 20% of the schemes. This category encompasses the integration of multiple farming techniques to enhance carbon sequestration and improve overall farm sustainability. Grassland management measures make up 11% of the schemes, emphasizing the importance of maintaining and improving grassland areas to support carbon storage and biodiversity. Organic or regenerative farming practices account for 7% of the measures. These practices focus on sustainable farming techniques and soil health to improve carbon capture and ecosystem equilibrium. Afforestation and rewetting represent 5% of the total while the use of catch and cover crops each represent the 3% of the applied measures. Afforestation involves planting trees to create new forests; rewetting involves restoring wetland areas to their natural state and guarantee carbon storage while catch and cover crops are used to protect soil from erosion and nutrient loss and guarantee higher carbon inputs to the soil. Manure and compost management practices (2%) are among the less common practices chosen from the carbon farming schemes.

## Agricultural Measures



*Figure 10 Distribution of the schemes over different carbon farming measures*

### 3.7 Co-benefits

Another relevant element for the evaluation of a scheme are co-benefits.

Co-benefits are additional positive impacts, obtained from a carbon farming scheme, that go beyond simply reducing GHG emissions and increasing carbon stocks. They can cover various aspects, including economic, social, cultural and environmental ones. Unfortunately, in the database, we do not have enough data for this category to produce infographics, but we consider it appropriate to list the co-benefits promoted by the carbon schemes for which this information is available. In 69 schemes there is direct or indirect reference to the co-benefits listed below, while in the other schemes it can be assumed that they are in any case associated with one of these groups of co-benefits. The inventoried co-benefits can be grouped into the following macro-categories:

- Increased awareness of farmers and other stakeholders to implement sustainable agricultural and forestry management practices;
- Increased awareness of the opportunities offered by carbon farming;
- Involvement of local communities in land protection processes;
- Adaptation to climate change;
- Increased biodiversity;
- Improved nutrient cycling and water storage capacity;
- Improvement of air and water quality;
- Conservation of soil, fertility and landscape;
- Reducing fossil fuel consumption and producing renewable energy.

## 4. Conclusions

At a time when climate change mitigation is of paramount importance, carbon farming initiatives can play a crucial role. The C.S.I. Carbon Scheme Inventory platform offers stakeholders and users a unified source of information and promotes the dissemination of data in the carbon farming sector. It can respond to different needs of policy institutions, project developers and certification bodies, ensuring that data surveyed by a group of experts are easily accessible while respecting privacy regulations.

C.S.I. represents a web-based tool with the objective of supporting the monitoring of voluntary carbon certification schemes, facilitating a comparison of the various existing approaches in line with global efforts to combat climate change.

In this sense, the C.S.I. platform brings together, in a systemic framework, a multiplicity of certification schemes, otherwise difficult to access, providing a useful knowledge base to guide the development of European and national regulations of voluntary certificates that are robust and consistent with the financial instruments currently used in the carbon farming field.