



Low-carbon Farming: building a sustainable future

Plan for support in business development and Action plan

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6	ZDRUZENIE PLATFORMA ZA ZELEN RAZVOJ SKOPJE	GGP	RNM
7	AGENCIJA ZA POTTIKNUVANJE NA RAZVOJOT NA ZEMJODELSTVOTO	APRZ	RNM
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14	PANAGROTIKOS SYNDESMOS KYPROU SOMATEIO	PSK	EL

Executive Summary

Deliverable 4.1 *Plan for support in business development and Action plan* is developed and implemented in the framework of the CARBONICA project, under Work Package 4 CARBONICA EH Support for business development, Task 4.1 Plan for Support in Business Development. The activities in T4.1 provide focused and effective support to both technology providers/ innovators and farmers as users of carbon farming solutions within the CARBONICA Hub and beyond.

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Glossary of terms and abbreviations used

List of Abbreviations and Acronyms	
Abbreviation #1	Acronym #1
BMC	Business Model Canvas
R&I	Research and Innovation
IPR	Intellectual Property Rights
CARBONICA EH	Carbonica Excellence Hub
MAPs	Multi Actor Platforms

1 Introduction

The purpose of **CARBONICA** project is to establish CARBONICA Excellence Hub (CEH) by connecting the innovation ecosystems (IES) of three widening countries (WC) (CY, GR and NMK), while enhancing their TRL as service providers, based on cutting-edge technologies (Earth Observation – EO; in situ data; digital agriculture etc.) in carbon farming. The main scope is to establish access to excellence to all relevant stakeholders in the quadruple helix (QH) of the WC, as well as strengthen regional innovation capacity guided by long-term joint R&I strategy in the carbon farming field.

Task 4.1 Plan for Support in Business Development (M01-12) is led by AGFT and involves as participants the following partners: ECoE, FSH, CLK, i-BEC, UGD, CUT. The activities in T.4.1 will assure **focused and effective support** is provided to both technology providers/ innovators and the farmers as users of carbon farming solutions within the CARBONICA Hub and beyond. An action plan for business development support will be developed. Efficient and effective management will be established supported by experts in relevant areas from the three countries for the purpose of developing a portfolio of services provided to the participants. Finally, an infrastructure (e.g. common working space, video conference platforms) for delivering the business development and support services will be deployed. The report including the needs' analysis, the action plan and the syllabi for the support services in business development will be prepared within **D4.1 Plan for support in business development and Action plan** and will have two editions (M6, 12). The two editions of the Deliverable 4.1 will be prepared by AGFT as leader of the complementary task 4.1, and the final edition of D4.1 will be reviewed by all the contribution partners (ECoE, FSH, CLK, i-BEC, UGD, CUT) before its submission.

The structure of the first edition of D4.1 **Plan for support in business development and Action plan** is as follows:

- Report on the needs' analysis – data related to the needs of technology providers and farmers (to be included in the second edition),
- Action plan for support in business development and
- Syllabus for the support services in business development

The activities within WP4 and T4.1 in particular are related to the needs analysis of T1.1, the specifics of the CF certification protocols addressed in T3.2, and the network created in T5.3, in the following way:

- Task 1.1 Mapping of the current state-of-play in carbon farming ecosystems (M01-12) is led by ECoE and supported by all partners. As soon as the needs analysis is finished, ECoE should provide the results to AGFT in order for these results to be integrated in the final version of D4.1. (M15). The integration will mainly involve updating the Syllabus for the support services in business development based on the needs identified among technology providers and farmers.
- Task 3.2 Validation of toolbox and Lab Prototype (M06-36) is led by ECoE and supported by: i-BEC, AGFT, MNEA, ARI, UGD, CUT, SCI, HAS, PSK. Within this task, two lab prototypes will be developed: 1 lab prototype for carbon farming solution and 1 lab prototype of protocols for accreditation and certification tailored to the stakeholder needs identified in T1.1 and in close collaboration with actors from the MAPs, to open opportunities for future large-scale pilots and demonstrators. Since in the context of farmers, the acceleration will include support services for implementation of CF and introduction of protocols for CF certifications, all the information related to the specifics of the CF certification protocols that will be available until M11 will be included within the final edition of D4.1, in particular within Module 1 (see Section 4 of this document). AGFT will work in close cooperation with ECoE (regular coordination) regarding this activity.
- Task 5.3 Stakeholder engagement and networking (M12-48) is led by FSH and supported by all partners. The three regional networks that will be created within T5.3 (one in each involved WC), will include stakeholders from the quadruple helix (academic institutions, business entities, public authorities/ organisations, and society). These networks will be an important channel for promotion of the acceleration program in each involved country. Since the activities of T5.3 start at month 12, and the acceleration activities (T4.3) start at month 18, AGFT expects that there will be enough time to establish the synergies between these two tasks in the period M12-M18. For this purpose, AGFT will work in close collaboration with FSH through regular coordination.

AGFT foresees also to establish synergies between T4.1 and T1.3 Capacity building of stakeholders (M12-48), led by CUT and supported by all the partners in terms of integrating contents from the interactive e-learning platform relevant for farmers and technology providers, on the topics of carbon farming solutions, CF certification protocols and business development in the virtual platform for support in business development. The coordination on these synergies will be done in the period M13-M24 when the services for support in business development will be defined and developed and the preparation activities of T1.3 will have started.

1.1 Carbon farming

Carbon farming is a comprehensive approach to mitigating climate change by effectively managing carbon pools, flows and greenhouse gas (GHG) emissions at the farm level. It involves the careful management of land and livestock, as well as the carbon stored in soils, materials, and vegetation. This includes regulating the release and uptake of key greenhouse gasses like carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O), all of which play a significant role in the agricultural sector according to the Intergovernmental Panel on Climate Change (IPCC). Carbon farming is a capable strategy for more sustainable production of food and other related products.

The benefits of carbon farming can be grouped as: 1) Environmental: enhanced soil quality; biodiversity conservation; enhanced functioning of ecosystems; livestock management; improved farm productivity and **2) Socio-economic:** carbon credits; improved infrastructure; indigenous land management; community development; increased farm income (Sharma, M. et al., 2021).

In the European Union, the European Green Deal has transformed the context for carbon farming. Strategies like the Farm to Fork Strategy, Circular Economy Package, and forthcoming Fit for 55% Communication highlight the need to provide better incentives for carbon management within the land-based sector to drive the necessary transformative changes by 2050. Enhancing land managers' and farmers' **knowledge and implementation** of carbon farming is a critical factor in achieving this goal, along with the establishment of a robust and transparent governance system that defines clear and common rules for monitoring, reporting, verification (MRV), and the utilization of outcomes from carbon farming activities (COWI, Ecologic Institute and IEEP, 2021).

1.2 Support in business development

Support in business development refers to the range of services, programs, and resources provided to entrepreneurs and businesses to help them grow, innovate, and achieve their goals. Support services for business development are mostly provided through **acceleration programs**, which are designed to provide entrepreneurs and startups with the necessary tools, resources, and networks to accelerate their growth and increase their chances of success. These programs offer a range of support services aimed at enhancing entrepreneurial skills, fostering innovation, and facilitating market access. Accelerator programs may include trainings, mentoring and a demo day, where participating startups present their business ideas to potential investors and other interested parties (Giourka, P. et al., 2021).

Business accelerators expedite the development of innovative business ideas into viable projects for startups and existing businesses. Unlike other, more traditional consultancy services, accelerators involve a team of experts, offer customized assistance, and prioritize participant needs. They take a holistic approach to business innovation and emphasize peer-to-peer exchange and collective learning. Accelerators are time-limited programs that target motivated entrepreneurs, utilize networking extensively, and provide comprehensive support from idea generation to business launch (European Network for Rural Development, 2017). When it comes to starting up an accelerator program the main triggers can be: insufficient business support for new innovative business ideas that can respond to emerging trends and new opportunities; vision to transform a region and, in particular, rural areas through developing businesses that respond to new opportunities and challenges effectively or the need to provide support to dynamic entrepreneurs who possess a strong potential for innovation. Of particular importance are

accelerator programs in rural areas, which can contribute to the growth and success of businesses by fostering innovation, creating new connections, improving skills, and enhancing market orientation. These programs empower entrepreneurs and have a positive impact on the development of rural economies.

A significant share of the services for support in business development focuses on the **internationalization and commercialization** of the business in question. Internationalization is the process by which companies expand their operations into international markets, including both the European Single Market and other, non-EU markets as well. This expansion is primarily achieved through the export of goods or services but may also include the import of goods and engagement in technical cooperation with foreign entities. Support in business development may include guidance on entering new markets, international expansion and adaptation of business models for global operations. Other areas of support may have to do with market entry strategies, localization considerations, and regulatory compliance (Koch, 2017). Commercialization involves transforming an innovative idea or concept into a viable and profitable business venture. Commercialization has an impact on local and regional economic growth, knowledge transfer, entrepreneurship, and job creation (Jamil, Ismaili, & Mahmood, 2015). Support for commercialization in business development aims to provide entrepreneurs and companies with the necessary guidance, resources, and strategies to effectively bring their products or services to market (Regional Research and Development Agency of Lampung Province et al. 2020). Support for commercialization and internationalization aims to help start-ups and small and medium-sized enterprises (SMEs) prepare their final products for successful market launch. This assistance is crucial because SMEs often face internal and external factors that can hinder their ability to expand internationally and engage in trade. These challenges include limited knowledge of international business opportunities, complexities surrounding foreign laws and regulations, administrative barriers, resource constraints such as limited access to finance, risk aversion, and a lack of awareness about available support programs (McDonald, H. et al., 2021).

1.2.1 The users of the services for support in business development within CARBONICA

In CARBONICA, there are two primary groups of stakeholders: the farmers and the technology providers of carbon farming solutions. **Farmers** play a central role in carbon farming as they are the ones who implement the practices and manage the land to sequester carbon dioxide from the atmosphere. The key arguments for considering farmers as a target group for each carbon farming initiative are the following:

- Farmers are landowners or leaseholders who can make decisions regarding land use and management practices.
- Farmers possess knowledge and experience in various farming techniques, soil management, and crop or livestock production. They are familiar with the specific conditions of their land, such as soil types, climate, and availability of local resources.
- Farmers adopt specific practices that can promote carbon sequestration, such as planting cover crops, using conservation tillage methods, employing agroforestry or implementing rotational grazing systems. They are responsible for implementing and maintaining these practices.
- Farmers are concerned about the economic viability of carbon farming. They evaluate the financial implications of implementing carbon sequestration practices, including potential costs, benefits, and incentives.
- Farmers aim to maintain or enhance land productivity while implementing carbon farming practices. They need to balance carbon sequestration goals with agricultural productivity to ensure sustainable and profitable farming operations.
- Farmers are affected by policies and regulations related to carbon markets, carbon credits, and emissions reduction targets. They may be eligible for financial incentives or subsidies provided by governments or other organizations.

Technological providers are individuals, companies, or organizations that develop and provide technological solutions to support and enhance carbon farming practices. Here are some key aspects describing technological providers as a core target group for carbon farming initiatives:

- Technological providers engage in research and development activities to create innovative solutions for carbon farming. They develop new tools, techniques, and technologies to improve carbon sequestration, monitor greenhouse gas emissions, and enhance overall farming efficiency.
- Technological providers offer tools and systems for monitoring and analyzing various environmental parameters, including carbon levels in soils, emissions, and other relevant data. These technologies help farmers track their progress and make informed decisions.
- Providers develop software and data platforms that assist farmers in managing and optimizing their carbon farming practices. These platforms may include features like data visualization, modeling, and decision support tools.
- Companies that are offering equipment for carbon farming practices, such as precision agriculture equipment (VRT spreaders, seeders, etc.), as well as combined mechanization for direct seeding (no till and minimum tillage practices). Additionally, selling or providing IoT hardware for data gathering.
- Technological providers may offer advisory services to farmers, providing guidance on the selection and implementation of carbon farming practices. They can assist in identifying the most suitable practices for specific farm contexts and help farmers navigate the complexities of carbon markets and certification processes.
- Technological providers actively collaborate with farmers to understand their needs, gather feedback, and refine their solutions. This collaboration helps ensure that the technological offerings are practical, user-friendly, and aligned with the farmers' goals and constraints.
- Providers may also facilitate the connection between farmers and carbon markets, helping farmers access potential revenue streams through carbon credits or other financial incentives.

Overall, the **collaboration between farmers and technological providers** is crucial for the successful implementation and advancement of carbon farming practices, enabling sustainable agriculture and contributing to climate change mitigation efforts.

2 Needs analysis

Task 1.1 Mapping of the current state-of-play in carbon farming ecosystems will involve mapping of the current situation of the regional IES in carbon farming in CY, GR and NMK. The needs analysis as one of the activities within T1.1 will be based on a survey of 200 stakeholders and >60 face-to-face interviews involving farmers, advisors, industry, and policy makers. The needs analysis will be employed to uncover **stakeholder needs** regarding existing infrastructure, R&I capacities of IES and policy frameworks.

Since T1.1, including the needs analysis is expected to be completed in the following months, the results of the analysis will be added as an annex in the final edition of the D4.1 (M15).

3 Action Plan for Services for support in business development

Goal 1 Define and develop the services for support in business development, design the way of execution and the access through the platform

Responsible: project partners (AGFT, ECoE, FSH, CLK, i-BEC, UGD, CUT) and experts in relevant areas from the three countries (MK, CY, GR).

Timeline: M13-M24

Actions:

- **Defining** the services for support in business development with focus on carbon farming - Based on the review of current available services for support in business development with focus on carbon farming, CARBONICA **envisions 5 general categories of services** within **T4.1**, explained in detail in Section 4 of this document (Syllabus). Depending on how the content is delivered, it can be passive (module 1) and/or interactive (modules 2-5). *Passive content* is content that becomes available upon the users' request, it is available by simple navigation of the platform and it is compiled depending on the user's interests.. *Interactive content* is delivered in different forms, such as: workshops, trainings, mentorships, being supported through various collaborative and communication tools such as video conferencing, emailing, forums and instant messaging .
- Once the services are defined, the **development** of the services will follow – i.e. the process of adaptation of the available data and content in the relevant modules to the specific need of the topic of carbon farming. Additionally, the adaptation will consider the specifics of the users (technology providers and farmers) for the scope and scale of the farming in the focus regions of the Carbonica project.
- The last step for Goal 1 is to determine the **methods of execution** of the services and access through the platform. Identified possible forms of execution of the services include: workshops, trainings, coaching and mentorship and the complementary digital tools for the execution would be: video conferencing, emailing, forums and instant messaging.

Resources: Syllabus provided in Section 4 of this document and the needs analysis within T1.1.

Outcomes: Report including the types of services, their content, concept of execution through the virtual platform (M24).

Goal 2 Establishing virtual infrastructure for support in business development

Responsible: AGFT, ECoE, i-BEC; **CLK (tbc)**

Timeline: M12-M36

Actions:

- Determine the **format and functionalities** of the platform. The platform will have a **passive and interactive part** (see Syllabus in Section 4). The passive part consists of information and tools and the interactive part will be used for delivering the business support services in the form of organizing workshops and trainings and coaching and mentorship.
- Define the digital **collaborative tools** (e.g. video conferencing, emailing, forums and instant messaging) that will be used for Acceleration (Goal 3) and Support for commercialisation and internationalization (Goal 4).
- **ICT development** of the informative (passive) component (empirical, applicative and theory), the interactive component and the collaborative tools:
 - define the architectural design – identifying the components and subsystems that are needed to meet the platform requirements;
 - define the technology stack - the languages, frameworks, libraries, and tools needed to develop the platform;

- develop the back-end - responsible for the server-side operations that power the platform (building APIs, databases, and integrations);
- create the front-end, i.e. the user interface of the platform (the design, development, and testing of the platform's web and mobile interfaces);
- implement security measures (access controls, authentication, and encryption) to ensure the safety of user data and prevent cyber threats;
- test and debug to ensure the platform functions as expected, and troubleshoot any issues that arise;
- launch and maintain the platform to meet the evolving needs of users.

➤ **Piloting and validation.**

Resources: Syllabus provided in Section 4 of this document.

Outcomes: The expected outcome is a functional platform including the informative (passive) component (empirical, applicative and theory), the interactive component and the collaborative tools.

Goal 3 Acceleration – supporting startups and SMEs in the process of stabilization and becoming self-sufficient with the initial business idea

Responsible: Leader: i-BEC; Participants: ECoE, AGFT, FSH, CLK, UGD, CUT

Timeline: M18-42

Actions:

The acceleration program within T4.3 will be conducted through the following stages:

- **Inform** about the program through the social media of the project and other relevant channels in each involved country (CY, GR, NMK), including the three regional networks that will be created within T5.3 (one in each involved WC).
- **Identify and select participants** and set goals together. The initial business models of the interested participants will be fundamental for these activities. Eligibility criteria for participating farmers may consider factors like land size, farming practices, geographic location, and compliance with environmental regulations.
- **Further development of the initial business model** through using the digital collaborative tools within the virtual platform, as well as live collaboration (meetings and workshops). For these purposes, the interactive components of the virtual platform (Modules 2-5 included in syllabus in Section 4 of this document) will be used. In the context of farmers, the acceleration will include support services for implementation of CF and introduction of protocols for CF certifications (supporting materials will be provided within Module 1 – see Section 4 of this document).
- **Preparing the final pitch deck** – prepare the participants for successful presentation, pitch creation for attracting investments/ technical support for assistance and mentorship in the process of pitching and attracting investors.
- **The Demo Day** will mark the culmination of the accelerator program and will provide the opportunity for the participants to showcase their progress and present their businesses. An expert committee will be established consisting of representatives from each innovation ecosystem (CY, GR and NMK), including potential investors, mentors, industry experts, and the general public. During the Demo Day, each participant is given a designated time slot to pitch their product or service to the audience. The participants present their business plans, share key metrics and milestones achieved during the program and demonstrate their product or service. The expert committee will select the 15 best participants that will go in the second round of the acceleration program.
- The **second round** of the program will be focused on providing support for further development of entrepreneurial skills for the selected 15 participants. Support services in the following areas will be included: marketing and brand development, evidence-based decision making, negotiation and financial planning (see more details in Module 6 of the Syllabus). The digital collaborative tools within the virtual platform will be used for this purpose, combined with live collaboration (meetings and workshops).

Resources/Channels for implementation: The **interactive component** of the virtual platform and **collaborative tools** through the created virtual infrastructure in T.4.2 (video conferencing, email, forums, instant messaging), as well as **live collaboration** (meetings and workshops).

Outcome: The 15 best participants will complete the second round of the acceleration program.

Goal 4 Support for commercialisation and internationalisation - preparing the final product of the start-ups and SMEs to be launched on the market (local, regional and international)

Responsible: Leader: AGFT; Participants: ECoE, FSH, CLK, UGD, CUT

Timeline: M12-M48

Actions: The services within T4.4 for support in **commercialization and internationalization** will be centered around providing specialized mentorship by business operators and academia from each of the involved ecosystems for the participants that will complete the second round of the acceleration program. The program for support for commercialization and internationalization will cover the following domains:

- Specialized mentorship in **understanding market needs and effective market research** – This refers to the process of gathering and analyzing information about target markets, customers, and their preferences, as well as identifying market trends and demands. This involves conducting systematic research to gain insights into customer behavior, market dynamics, competitors, and other relevant factors that influence business decision-making. The aim is to obtain a comprehensive understanding of the market landscape and customer requirements in order to develop products, services, and marketing strategies that align with market needs and maximize business opportunities. Effective market research is important as long as it performs exploratory, descriptive, diagnostic, and predictive functions (Rajiv et al., 2006).
- Specialized mentorship in **setting up production and distribution processes** – This involves establishing the necessary systems and procedures to manufacture goods or deliver services efficiently and effectively. To achieve an effective product strategy, it is crucial to carefully select, design, and define the product before transitioning it into production. Only when this strategy is executed successfully can the production function contribute its utmost to the organization. The operations manager plays a key role in building a product development system that is capable of conceiving, designing, and producing products that will provide a competitive advantage for the company. Throughout the product life cycle (introduction, growth, maturity, and decline), the options available to the operations manager may change.
- Specialized mentorship in **conducting thorough product development** - Defining products is facilitated through written specifications, bills of material, and engineering drawings. Similarly, during the actual production process, assembly drawings, assembly charts, route sheets, and work orders are often employed to assist in manufacturing the product. Once a product is in production, value analysis becomes relevant to ensure its maximum value. Engineering change notices and configuration management are used to provide documentation for the product, enabling effective management of any changes or modifications. This process typically includes several key steps (Heizer et al., 2017): 1) Designing the production process: This involves determining the most optimal and cost-effective methods for producing goods or delivering services. It includes planning the sequence of operations, selecting appropriate technologies and equipment, and identifying resource requirements; 2) Procurement of resources: This step involves acquiring the necessary raw materials, components, equipment, and human resources required for production. It may involve sourcing suppliers, negotiating contracts, and managing the supply chain to ensure a steady and reliable flow of inputs; 3) Facility layout and infrastructure: Designing the layout of production facilities is crucial for maximizing efficiency. Factors such as workflow, space utilization, equipment placement, and safety considerations need to be considered. Additionally, establishing the required infrastructure, such as utilities and support systems, is essential for smooth operations; 4) Production planning and scheduling: This involves developing a comprehensive plan for the production process, including defining production targets, allocating resources, and creating schedules. It includes determining the production sequence, coordinating different stages of production, and ensuring timely delivery; 5) Quality assurance and control: Implementing quality control measures is essential to ensure that products or services meet the required standards. This involves establishing quality control processes,

conducting inspections and tests, and implementing corrective actions to address any deviations or defects; 6) Distribution and logistics: Establishing an effective distribution network involves determining the most efficient routes, selecting appropriate transportation modes, and managing inventory levels. This includes warehousing, order fulfillment, transportation coordination, and optimizing logistics operations to ensure timely delivery to customers; 7) Continuous improvement: Ongoing evaluation and improvement of production and distribution processes are crucial for enhancing efficiency, reducing costs, and meeting changing market demands. This involves monitoring key performance indicators, gathering feedback from customers and employees, and implementing process enhancements and innovations. The goal is to ensure that the product is fully functional, valuable, and competitive before it is introduced to the target market.

- Specialized mentorship in access to **IPR management tools** (e.g., patent searching/drafting, freedom to operate) - Intellectual Property Rights (IPR) refer to the legal rights granted to innovative and original ideas. These rights serve as a means to prevent unauthorized use of these ideas by third parties. The various categories of IPR include Copyright, Trademark, Geographical indications, Industrial designs, Patents, Integrated Circuits, and Trade secrets. All IPRs typically prohibit third parties from commercially disclosing protected and confidential content without the originator's permission for a specified period. This enables IPR owners to confidently share their innovations and disseminate them among others. IPRs play a vital role in fostering creativity, encouraging innovation, and ensuring the orderly marketing of goods and services. The underlying principle behind all IPRs is to provide protection against undesired competition. Access to intellectual property rights (IPR) management tools is essential for organizations to effectively protect and leverage their intellectual assets. These tools encompass various aspects, including patent searching and drafting, as well as freedom to operate analysis (Datta et al., 2016). Having access to tools for managing intellectual property rights (IPR) is crucial for organizations to safeguard and utilize their valuable intellectual assets. These tools include capabilities for conducting patent searches, preparing patent drafts, and assessing freedom to operate.

Resources: The **interactive component** of the virtual platform and **collaborative tools** through the created virtual infrastructure in T.4.2. To assure that the CARBONICA EH will achieve an optimal usage of the available R&I capacities of each of the involved ecosystems, a strong link between the **business operators** and the **academia** will be established by providing **specialised mentorship** in all processes that support commercialization and internationalisation.

Outcomes: Report on the completed activities of the participants within the program for support in commercialization and internationalization.

4 Syllabus for the support services in business development for technology providers and farmers

The Syllabus consists of both the passive and interactive components (Modules 1-6) that will be used in the Acceleration activities (T4.3). Module 1 will be the passive component of the support services for business development and will present a service that is used upon users' request through their direct access on the platform and navigation that is defined based on the users' interest. The contents included in this component will be grouped in the following categories: databases, guidelines, scientific research, important literature and results from the CARBNONICA project. The interactive modules 2-5 covered in the virtual platform will be those included in the business model canvas by Alexander Osterwalder. The interactive module 6 consists of the materials for the second round of the Acceleration program (Further development of entrepreneurial skills).

4.1 Module 1: Basic information for carbon farming

4.1.1 Databases

This section will provide a comprehensive database of documents related to greenhouse gases, the carbon economy, and carbon farming at the European Union (EU) level. The documents are sourced from various platforms including scientific journals, blogs, and magazines. The URLs of these documents are also provided for easy access.

Greenhouse Gases at EU Level

The key sources of documents regarding greenhouse gases at the EU level include the European Environment Agency, Statista, Center for Climate and Energy Solutions, Our World in Data, Greenmatch, and the United States Environmental Protection Agency. These sources provide comprehensive data and insights on greenhouse gas emissions in the EU.

- [European Environment Agency](#)¹
- [Statista](#)²
- [Center for Climate and Energy Solutions](#)³
- [Our World in Data](#)⁴
- [Greenmatch](#)⁵
- [United States Environmental Protection Agency](#)⁶

4.1.2 Key Guidelines

The European Commission's Communication on Sustainable Carbon Cycles, adopted in December 2021, provides key guidelines for the EU agricultural carbon economy. This document encourages the agriculture and forestry sectors to contribute to climate action and the European Green Deal by enhancing carbon dioxide (CO₂) uptake and storage in soil (carbon farming). The Communication outlines actions to address challenges to carbon farming and upscale this green business model. It promotes carbon farming practices under the Common Agricultural Policy (CAP) and other EU programs such as LIFE and Horizon Europe. The document also emphasizes the need for standardization of monitoring, reporting, and verification

¹ *EEA Greenhouse Gases - Data viewer* (2023) European Environment Agency. Available at: <https://www.eea.europa.eu/data-and-maps/data/data-viewers/greenhouse-gases-viewer> (Accessed: 15 June 2023).

² *Topic: Emissions in the EU* (2023). Available at: <https://www.statista.com/topics/4958/emissions-in-the-european-union/#topicOverview> (Accessed: 15 June 2023).

³ *Global Emissions* (2023). Available at: <https://www.c2es.org/content/international-emissions/> (Accessed: 15 June 2023).

⁴ Ritchie, H., Roser, M. and Rosado, P. (2020) "CO₂ and Greenhouse Gas Emissions", *Our World in Data*, p. Available at: <https://ourworldindata.org/co2-and-greenhouse-gas-emissions> (Accessed: 15 June 2023).

⁵ *GHG Emissions by EU Country [Interactive Map] | GreenMatch* (2023). Available at: <https://www.greenmatch.co.uk/blog/2019/10/greenhouse-gas-emissions-by-country> (Accessed: 15 June 2023).

⁶ *Global Greenhouse Gas Emissions Data | US EPA* (2016). Available at: <https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data> (Accessed: 15 June 2023).

methodologies, improved knowledge, data management, and tailored advisory services to land managers.⁷

4.1.3 Key European Scientific Research Papers

The study on carbon farming, requested by the European Parliament's Environment, Public Health, and Food Safety Committee, provides a comprehensive overview of carbon farming in the EU. It identifies opportunities and constraints for carbon farming, options for financing, and open questions that need to be resolved to scale up carbon farming.⁸

Another key research paper is 'Achievable agricultural soil carbon sequestration across Europe from country-specific estimates. This paper discusses the potential for agricultural soil carbon sequestration across Europe based on country-specific estimates.⁹

4.1.4 The current objectives at EU level

At the EU level, there are several objectives and initiatives related to carbon farming that both technology providers and farmers should adhere to. These objectives are aimed at promoting sustainable agricultural practices, reducing greenhouse gas emissions, and enhancing carbon sequestration. Here are some key objectives:

- **Common Agricultural Policy (CAP):** The CAP, a major EU policy, includes measures to promote sustainable farming practices and support farmers in their transition to more environmentally friendly approaches. The CAP encourages the adoption of agri-environmental practices, including those related to carbon farming.
- **European Green Deal:** The European Green Deal is a comprehensive plan to make Europe climate-neutral by 2050. It sets targets to reduce greenhouse gas emissions and enhance carbon removals. Carbon farming is recognized as an important component in achieving these targets.
- **Farm to Fork Strategy:** The Farm to Fork Strategy is part of the European Green Deal and aims to create a more sustainable food system. It includes objectives to reduce the environmental impact of agriculture, improve soil health, and promote carbon sequestration through sustainable land management practices. Carbon farming appears in the Strategy as a new green business model that rewards farmers for removing CO₂ from the atmosphere and thereby contributes to the sustainability of the EU food supply chain. The Strategy foresees a potential role for both the CAP and other public and private initiatives in financing carbon farming. It specifically highlights the ecoschemes under the 2023-2027 CAP as a key source of funding for carbon farming and other sustainable land use and management practices.
- **EU Climate Law:** The EU Climate Law enshrines the commitment to achieving climate neutrality by 2050 and sets a binding target to reduce net greenhouse gas emissions by at least 55% by 2030. Carbon farming plays a crucial role in reaching these ambitious targets.

European Innovation Partnership for Agriculture Productivity and Sustainability (EIP-AGRI): EIP-AGRI encourages collaboration and knowledge exchange among farmers, researchers, and technology providers. It supports innovative projects and practices, including those related to carbon farming, to enhance agricultural productivity while addressing environmental challenges.

⁷European Commission – Climate change – restoring sustainable carbon cycles (2023). Available at: https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13066-Climate-change-restoring-sustainable-carbon-cycles_en (Accessed: 15 June 2023).

⁸ Carbon farming | Making agriculture fit for 2030 | Think Tank | European Parliament (2021). Available at: [https://www.europarl.europa.eu/thinktank/en/document/IPOL_ATA\(2021\)695487](https://www.europarl.europa.eu/thinktank/en/document/IPOL_ATA(2021)695487) (Accessed: 15 June 2023).

⁹ Rodrigues, L., Hardy, B., Huyghebeart, B., Fohrafellner, J., Fornara, D., Barančíková, G., Bárcena, T. G., De Boever, M., Di Bene, C., Feizienė, D., Kätterer, T., Laszlo, P., O'Sullivan, L., Seitz, D., & Leifeld, J. (2021). Achievable agricultural soil carbon sequestration across Europe from country-specific estimates. *Global Change Biology*, 27, 6363–6380. <https://doi.org/10.1111/gcb.15897>

4.1.5 Existing carbon farming technologies/solutions

Increasing soil carbon stocks in agricultural soils removes carbon dioxide from the atmosphere and contributes towards achieving carbon neutrality. In that context farmers are constantly adopting various carbon farming practices to reduce greenhouse gas emissions and enhance carbon sequestration. The adoption of these practices can vary depending on factors such as farm size, location, climate, and available resources (Paul et al., 2023). The existing carbon farming solutions include: **soil management, crop management, and post-harvest practices**, highlighting the methods, equipment/software provided by technology providers, data sources, and data collected in each domain.

- **Soil management** practices for carbon farming involve analyzing the soil through site-specific sampling and multispectral images. This is facilitated by the use of equipment and software such as GPS-based soil sample extractors, satellites or UAVs with multispectral cameras, IoT devices for agro meteorology, GIS, and in-situ toolboxes. Data is collected from laboratory measurements, GPS, and spectral analysis. The resulting information includes site-specific soil maps detailing properties like organic material, EC, pH, NPK, and micronutrients, as well as orthorectified multispectral images and soil zonation.
- **Crop management** in carbon farming includes practices such as field zoning, variable rate technology (VRT) configuration, precision plant nutrition, agro meteorology, crop analysis using multispectral images, decision support methods, crop moisture assessment, disease models, digitally supported pest management, evapotranspiration models, precision irrigation, and minimum tillage. This involves utilizing tools like satellites or UAVs with multispectral and NDVI cameras, IoT devices for soil and agro meteorology, GIS, digital pheromone traps, UAVs for spraying and fertilizing, as well as mobile toolboxes with soil, atmospheric, and vegetation sensors. Data is sourced from satellites (such as Copernicus), airborne observations, in-situ data, crowdsourcing, and lab measurements. The collected data includes site-specific maps, orthorectified multispectral images, VRT maps/zones, weather forecasts, microclimatic data, soil parameters, site-specific soil maps, NDVI images, Moisture Index images, and in-situ soil measurements.
- **Post-harvest management** involves calculating logistics related to energy and fuel consumption during the transportation, storage, and processing of products. It also entails determining the type and quantity of materials used for storage, transportation, and processing. This is facilitated by GPS-based software for transportation parameters, IoT equipment for measuring energy use in storing/processing facilities, and equipment for quantifying storing/processing materials. Data collected includes information about the type and quantity of fuel and energy usage, as well as the type and quantity of materials used in storing and processing the products.

4.1.6 Materials that will result from the project Carbonica

- D1.1 Integrated framework of regional R&I excellence and toolbox of carbon farming solutions M15
- D1.4 CARBONICA Hub's MAPs (C, update) M48
- D1.6 Capacity building activities (B, update) M48
- D1.9 Brain gain strategies (C, update) M48
- D2.3 Joint R&I strategy (C, update) M48
- D2.6 CARBONICA Hub Action and Sustainability plan (C, update) M48
- D3.3 Piloting Plan and Validation Report (C, update) M48
- D3.4 Recommendations for upscaling M48
- D3.5 Certification and accreditation protocols M48
- D4.2 Plan for support in business development and Action plan (B, update) M15
- D4.4 Report for support in Business Development (B, update) M48
- D5.5 Policy recommendations M48

4.1.7 Key Resources on EU Carbon Farming, policy, and existing certification schemes

The study provided by the European Parliament "Farm certification schemes for sustainable agriculture" presents the concepts and methods of farm certification schemes and provides information on the main

existing schemes in the EU and in third countries. It analyses how these schemes can help the EU reach its sustainability objectives in the farming sector and be instrumental in the implementation and monitoring of the related CAP instruments during the upcoming programming period.¹⁰

The eAgronom Carbon Programme is a carbon farming manager that offers payments at the start of the carbon program to help farmers manage outcomes and profits at an early stage.¹¹

Regarding policy recommendations for carbon farming, the European Environmental Bureau has created a report on CARBON FARMING FOR CLIMATE, NATURE, AND FARMERS.¹²

4.2 Module 2: Market

4.2.1 Customer segments

Customer segmentation involves dividing the market into distinct groups of customers who have similar characteristics, needs, and preferences. Understanding customer segments is essential for effective marketing and tailoring your products or services to specific target audiences. In the context of carbon farming, customer segments can be:

- **Businesses and Organizations:** Many businesses and organizations are increasingly concerned about their carbon footprint and are actively seeking ways to reduce and offset their emissions. This includes corporate entities, government agencies, educational institutions, and non-profit organizations. They may be interested in partnering with carbon farming projects to achieve their sustainability goals.
- **Sustainable Brands and Consumer Goods Companies:** Companies that prioritize sustainability and environmental stewardship often seek partnerships with carbon farming projects. They may be interested in sourcing agricultural products from carbon farmers to promote sustainable supply chains and enhance their brand image. This segment includes food and beverage companies, clothing and textile brands, and personal care product manufacturers.
- **Eco-conscious Consumers:** A growing number of consumers are becoming more environmentally conscious and are willing to support products and companies that prioritize sustainability. This segment includes individuals who actively seek out eco-friendly and climate-friendly products, including those produced through carbon farming practices. They may be interested in purchasing carbon-neutral or carbon-negative products or supporting companies that invest in carbon sequestration projects.
- **Government Agencies and Policy Makers:** Governments play a crucial role in shaping policies related to carbon markets, offsets, and agricultural practices. Engaging with government agencies and policymakers can help in accessing subsidies, grants, and other forms of financial support for carbon farming projects. These entities may also be potential buyers of carbon credits for their own emission reduction goals.

It's important to note that customer segments in the context of carbon farming can vary based on regional factors, market dynamics, and the specific carbon farming practices employed. Carbon farming involves implementing specific techniques and practices that enhance carbon sequestration in soils, forests, or other agricultural systems. These practices contribute to mitigating climate change by reducing greenhouse gas emissions and increasing carbon storage. The potential users of this practices and services are farmers who are interested in sustainable and regenerative agricultural practices and are willing to adopt techniques that promote carbon sequestration. In some cases, farmers may work on leased land or collaborate with landowners who are not directly involved in farming activities. These landowners may have an interest in carbon farming because it offers an opportunity to enhance the environmental value of their land and potentially generate additional revenue through carbon credit sales.

¹⁰ Farm certification schemes for sustainable agriculture *Europarl.europa.eu*. (2023) Available at: [https://www.europarl.europa.eu/RegData/etudes/STUD/2022/699633/IPOL_STU\(2022\)699633_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2022/699633/IPOL_STU(2022)699633_EN.pdf) (Accessed: 15 June 2023).

¹¹ *Carbon Program — eAgronom* (2023). Available at: <https://www.eagronom.com/carbon> (Accessed: 15 June 2023).

¹² CARBON FARMING FOR CLIMATE, NATURE, AND FARMERS *Eeb.org*. (2023) Available at: <https://eeb.org/wp-content/uploads/2021/10/Carbon-Farming-Report-FINAL-WEB.pdf> (Accessed: 15 June 2023).

Environmental organizations and non-governmental organizations (NGOs) focused on sustainable agriculture and climate change mitigation are also potential users of farmers' services for carbon farming. They often provide support, guidance, and funding to farmers interested in adopting carbon farming practices.

Farmers and other potential users of carbon farming have several needs and interests, such as: financial incentives, technical expertise, access to markets etc. When it comes to awareness about the carbon market it can vary among farmers and potential users of carbon farming services. Some farmers may have a good understanding of carbon markets, particularly those who have already engaged in carbon farming or have been exposed to relevant information and training. However, many farmers may have limited awareness or understanding of carbon markets, including the mechanisms, requirements, and potential benefits associated with selling carbon credits.

4.2.2 Customer relationships

The customer relationships model is a comprehensive strategic framework that incorporates various techniques, such as personalization, engagement, loyalty programs, and data analysis, which companies utilize to manage and enhance their customer connection which leads to repeat business, referrals, and revenue generation. While marketing channels primarily focus on product distribution, the customer relationship model (CRM) is centered on building and maintaining lasting customer relationships in business operations. The customer relationship model is a comprehensive strategic framework that incorporates various techniques, such as personalization, engagement, loyalty programs, and data analysis, which companies utilize to manage and enhance their customer connection which leads to repeat business, referrals, and revenue generation. The customer relationship model is a valuable tool for planning product availability, evaluating performance, managing customer interactions, and streamlining billing and customer support processes.

The CRM can be divided into three functional categories: operational CRM, analytical CRM, and collaborative CRM, each of which is designed to serve a specific business objective. In some instances, companies may use a combination of CRM systems or tailor a solution that integrates features of each type to suit their particular needs (Baiyewu, n.d., 2015). The primary objective of *operational CRM systems* is to improve the management and efficiency of customer interactions through the execution of customer service, marketing, and sales functions. These systems strive to enhance customer acquisition and retention rates by utilizing automated marketing and sales processes to create leads, cultivate them, convert them into customers, and maintain their loyalty through effective communication and outstanding customer service. The automation incorporated in operational CRM systems includes marketing, sales, and customer service automation. *Analytical CRM systems* involve the examination, modelling, and assessment of customer data to establish a mutually beneficial relationship between the company and its customers. Using this data, companies can evaluate the efficacy of their marketing, sales, and customer service strategies and make necessary modifications. *Collaborative CRM* is a set of methodologies and technologies that facilitate the integration of business processes and content management across multiple enterprises. Its purpose is to establish and maintain profitable networks of customer and partner relationships. By providing insights into corporate sales, service, marketing, and product development, collaborative CRM aims to enhance customer support.

In the context of carbon farming CRM are important in the sense of:

- **Education and Awareness:** Many customers may not be familiar with the concept of carbon farming or its benefits. It's important to educate them about the environmental and climate benefits of your carbon farming practices. Providing clear and accessible information about how farming methods contribute to carbon sequestration, biodiversity conservation, and sustainable land management.
- **Transparent Communication:** Maintaining open and transparent communication with customers. Keeping them informed about your farming practices, progress, and any challenges you face. This can include regular updates, newsletters, and farm visits to showcase your work and involve customers in the process.

- **Quality Assurance:** Maintaining high standards of quality in your carbon farming practices. Using recognized protocols, certifications, and monitoring systems to ensure the accuracy and credibility of your carbon sequestration measurements. This will help build trust and confidence among customers.
- **Feedback and Evaluation:** Actively seek feedback from customers to understand their satisfaction level, identify areas for improvement, and address any concerns. Regularly evaluate the effectiveness of your customer relationship model and make necessary adjustments based on customer feedback and market trends.

4.2.3 Channels

According to Osterwalder's book 'Business Model Generation', the market channels as a separate segment of the business model canvas describes how a company connects with and provides value to its customer segments. These channels can be categorized into direct (such as in-house sales teams, online sales, or company-owned stores), or indirect channels (for instance, via partner agents or distributors) and can be physical or online. Through these channels, a company carries out activities like communication, distribution, display, and financial transactions to distribute its products and services (Munther Al-Dawood-Enterprise, 2023).

4.3 Module 3: Value Proposition

A value proposition is a statement or set of benefits that clearly communicates the unique value and benefits that a product, service, or solution offers to its customers. It answers the question, "Why should customers choose your offering over alternatives?"

In the context of carbon farming, a value proposition should highlight the specific advantages and benefits that carbon farming practices provide to customers. Here is some general information about its relevance to carbon farming:

- **Environmental Impact:** Carbon farming offers the opportunity to actively contribute to climate change mitigation and environmental conservation. Your value proposition should emphasize the positive impact of your farming practices on carbon sequestration, greenhouse gas reduction, and biodiversity conservation.
- **Emission Reduction:** Position your carbon farming practices as a reliable and effective solution for individuals, businesses, and organizations seeking to offset their carbon emissions. Clearly articulate how your carbon sequestration can be used to neutralize or offset emissions in a transparent and credible manner.
- **Sustainable Agriculture and Land Management:** Emphasize the sustainable land management practices that are integral to your carbon farming approach. Highlighting how farming methods promote soil health, reduce erosion, enhance water conservation, and protect natural habitats. Communicate how carbon practices contribute to long-term soil fertility, crop productivity, and the overall resilience of agricultural ecosystems.
- **Partnership and Collaboration:** Showcase willingness to collaborate and partner with customers to achieve their sustainability goals. Demonstrate that you are a trusted advisor and supporter of their environmental initiatives. Emphasize the value of long-term partnerships and how you can work together to achieve mutual environmental and business objectives.

4.4 Module 4: Infrastructure

4.4.1 Key-partners

A business partnership is an alliance between two or more commercial entities. Key partners are individuals, organizations, or companies that a business collaborates with to achieve its goals. This segment can be critical to the success of a company, as they provide expertise, resources, and capabilities that the business may not possess on its own.

When forming partnerships there are several important factors to consider. Clear partnership agreements should be drafted with legal counsel, expectations should be defined from the outset, and the impact on

customers should be evaluated. The partnership should be a win-win situation, with visible gains on every side. It's always important to select partnerships carefully, as some may seem promising in theory but fail practically. Companies may opt for a partnership to optimize resource utilization, create new resource streams, or mitigate risks. Partnerships can change over the course of a business's development cycle, with the types of partnerships required in the early stages differing from those required later on.

The types of partnerships can be divided into four categories: strategic alliances, co-opetition, joint ventures, and buyer-supplier relationships. *Strategic alliances* are between non-competitors and help to spread the risk of trying something new. *Co-opetition* is a strategic partnership between competitors, and both partners may share resources and development costs. Joint ventures occur when both partners have mutual interests in developing a new business. *Buyer-supplier* relationships are the most common type of partnerships that ensure a steady supply of products. Partnerships are usually formed for three reasons: optimization and economy of scale, reduction of risk and uncertainty, and acquisition of particular resources and activities. Optimization and economy of scale is a common motivation to enter into partnerships to achieve greater efficiency and cost-effectiveness. Reduction of risk and uncertainty comes with a good relationship with a key partner and a guarantee of supply (*Key Partners in Business Model Canvas*, 2015).

In the context of carbon farming, establishing effective partnerships and collaborations is crucial for promoting sustainable agricultural practices and mitigating climate change. Carbon farming involves implementing techniques that enhance carbon sequestration in agricultural soils and reduce greenhouse gas emissions. To ensure the success of carbon farming initiatives, various stakeholders need to work together towards a common goal. There are some key partners in the carbon farming industry that a company may rely on:

- **Farmers:** Farmers are the primary stakeholders in carbon farming initiatives. They are responsible for implementing soil carbon practices on their land, such as regenerative agriculture techniques, cover cropping, and agroforestry. By investing in soil carbon and adopting sustainable farming methods, farmers contribute to carbon sequestration and enhance overall environmental sustainability.
- **Companies:** Companies willing to invest in certificates are essential partners in carbon farming solutions. These companies recognize the importance of offsetting their carbon emissions and are committed to environmental sustainability. By purchasing CO₂ certificates from carbon farming initiatives, they can compensate for their carbon footprint and support the adoption of sustainable practices by farmers. The financial support from companies provides a crucial revenue stream for farmers and reinforces their efforts in adopting and maintaining carbon farming practices.
- **Consumers:** Consumers play a significant role in driving demand for carbon-neutral products and supporting sustainable agricultural practices. Their interest in CO₂ certificates demonstrates their commitment to reducing their carbon footprint and supporting environmentally friendly initiatives. By showing interest in and actively seeking out products with carbon-neutral certifications, consumers encourage farmers to adopt carbon farming practices and contribute to carbon sequestration efforts. Consumer awareness campaigns and education about the benefits of carbon farming can further promote consumer interest and drive market demand.
- **Regional Government:** Regional governments act as facilitators in the carbon farming process by providing support, funding, and regulatory frameworks. They play a critical role in creating an enabling environment for carbon farming initiatives to thrive. Regional governments may establish supportive policies and regulations that incentivize farmers to adopt sustainable practices and encourage companies to invest in CO₂ certificates.
- **Smallholder farmers:** Their participation and commitment to adopting sustainable practices contribute to overall carbon sequestration efforts and help build resilient and sustainable agricultural systems
- **Organization for support** is an organization that supports community-led land-use projects and provides certification for carbon farming initiatives. Their involvement ensures that carbon farming projects adhere to recognized standards and guidelines, enhancing credibility and transparency.
- **National Forestry Institute:** The National Forestry Institute provides expertise, guidance, and support related to forestry practices and sustainable land management. They contribute to the technical knowledge and implementation of carbon farming initiatives, particularly in relation to reforestation and tree planting.

- Tree nurseries – managed locally: Locally managed tree nurseries are important partners in carbon farming, providing farmers with high-quality seedlings and saplings for reforestation and agroforestry efforts.
- Research Institutions: Collaborating with research institutions is vital for advancing the science and knowledge base of carbon farming. Research institutions can conduct studies, monitor carbon sequestration efforts, and develop innovative techniques to enhance carbon storage in soils.

4.4.2 Key resources

Key resources are the specific assets that a company relies on to create and deliver value to its customers. They are critical resources that are essential to the functioning of the business and achieving its goals.

Identifying and managing key resources is crucial for the success of a company. By focusing on these resources, a company can ensure that it is making the most of its assets and investing in the areas that will have the biggest impact on delivering value to its customers and achieving its goals (Otola, 2020).

Additionally, there is a growing consumer demand for products that are certified organic, and governments are providing incentives to increase the conversion of production areas to organic farming (Bergstrand, 2022). Key resources can take many different forms, including human resources, financial resources, physical resources (such as infrastructure or equipment), intellectual property, and more.

In the context of carbon farming, key resources are crucial assets that enable companies to create and deliver value by implementing sustainable agricultural practices and mitigating climate change. There are some key resources :

- Human Resources: In carbon farming, human resources are responsible for various tasks, including managing agricultural practices, implementing carbon sequestration techniques, monitoring soil health, training farmers, and adopting innovative approaches and technologies.
- Financial Resources: Financial resources are necessary to support the implementation and scaling of carbon farming practices. These resources can be used to invest in infrastructure, equipment, research and development, training programs, and operational expenses. Financial resources in carbon farming can come from various sources, such as investments, grants, and subsidies.
- Networks: Engaging with farmers, agricultural organizations, research institutions, environmental groups, and government agencies can provide access to knowledge sharing, funding opportunities, market connections, and policy support.
- Technology: technology resources play a significant role in monitoring, data management, and decision-making in carbon farming. These resources include data collection tools, remote sensing technology, soil sensors, and data analytics platforms.

4.4.3 Key activities

Every business model needs a number of key activities. This segment describes the most important things a company must do to make the business model work.

The key activities in a business canvas model consist of product development, production and operations, marketing and sales, and customer service and support. Product development involves creating and improving products or services to meet customer needs.

In the context of carbon farming, there are several key activities that contribute to its success and effectiveness. These activities encompass carbon farming practices, business development, and lobbying for carbon financing and policy change.

- Carbon Farming Practices: This activity involves implementing various practices that promote carbon sequestration and reduce greenhouse gas emissions. Examples of carbon farming practices include reforestation, agroforestry, cover cropping, rotational grazing, and conservation tillage.

- **Business Development:** This activity focuses on developing and expanding the carbon farming business model. It involves raising awareness among cooperative clients about the benefits of carbon farming practices and encouraging their adoption.
- **Recruitment of New Farmers:** Encouraging and attracting new farmers to participate in carbon farming initiatives. This can involve outreach programs, educational campaigns, and providing information on the benefits and opportunities associated with carbon farming.
- **Monitoring Plantations:** Regular monitoring and assessment of carbon farming projects to ensure compliance with standards and verify the carbon sequestration outcomes. This activity involves collecting data, conducting field measurements, and using remote sensing technologies to track progress and quantify the carbon sequestered.

4.5 Module 5: Finance

4.5.1 Cost structure

Cost structure is one of the segment business canvas models which is essential in understanding the financial performance of a business. Cost structure refers to the various costs and expenses that a business incurs in its operations, including fixed costs and variable costs (McFarlane, 2017).

Fixed costs are those that remain constant regardless of the level of production or sales. Examples of fixed costs include rent, salaries, insurance, and equipment costs. These costs are typically incurred regardless of whether the business is operating at full capacity or not.

- **Equipment cost:** the cost of purchasing or leasing property, buildings, machinery, and equipment necessary for production.
- **Rent:** fertilizer companies need to rent or own facilities for production, storage, and distribution.
- **Salaries and wages:** the cost of paying salaries and wages to management and administrative staff, which are fixed regardless of the level of production.
- **Taxes and licenses:** the cost of paying taxes and obtaining licenses to operate the business (Odionye et al., n.d.).

Variable costs, on the other hand, are those that change with the level of production or sales. Examples of variable costs include raw materials, production labor, shipping, and packaging costs. These costs increase as production or sales increase and decrease as production or sales decrease.

- **Production labor:** which amount of labor is required depends on the volume of production.
- **Transportation costs:** the cost of transportation can vary depending on the distance, mode of transport, and other factors.
- **Marketing and distribution costs** which include advertising, sales commissions, and other expenses, can vary depending on the level of sales activity.

Economies of scale and economies of scope are also critical components of a cost structure. Economies of scale refer to the cost advantages that businesses can achieve by producing or delivering products or services in large quantities. In contrast, economies of scope mean that the production of one good reduces the cost of producing another related good. Economies of scope occur when producing a wider variety of goods or services in tandem is more cost-effective for a firm than producing less of a variety, or producing each good independently. In such a case, the long-run average and marginal cost of a company, organization, or economy decrease due to the production of complementary goods and services.

In the context of carbon farming, the cost structure refers to the various expenses incurred in implementing and maintaining carbon farming practices. These costs can vary depending on the specific activities. Understanding the cost structure is important for planning and budgeting, as well as for evaluating the financial viability and sustainability of carbon farming initiatives. There are some key components that contribute to the cost structure in the context of carbon farming, encompassing various expenses incurred in implementing and maintaining carbon farming practices.

- **Equipment costs:** This includes the expenses associated with purchasing or leasing machinery, tools, and other equipment required for carbon farming activities. Examples include agricultural machinery, irrigation systems, and biomass processing equipment.
- **Material costs:** These costs encompass the expenses incurred in acquiring the necessary materials for carbon farming practices. It may involve the purchase of seeds, seedlings, and compost.
- **Labor costs:** Manufacturing costs also include the wages and salaries of workers involved in the manufacturing process.
- **Monitoring and verification:** Monitoring and verification costs are associated with assessing the effectiveness of carbon farming practices and measuring carbon sequestration.
- **Training and education:** This is essential because farmers must familiarize themselves with the principles, techniques, and operational aspects of the carbon farming mechanism.
- **Marketing:** This can include advertising, attending conferences or trade fairs, engaging brokers or trading platforms, and developing marketing materials.
- **Research and development:** Investing in research and development activities to improve the efficiency, effectiveness, and scalability of carbon farming practices.

4.5.2 Revenue streams

Revenue Streams is one of the nine segments of the Business Model Canvas and it refers to the source of income or cash flow that a business generates from selling its products or services to its customers. In other words, it is the way in which company earns money. In that sense, this segment of the BMC helps the company to identify and analyse the various revenue streams that it can generate from its products or services. It also helps the company to determine the most profitable revenue streams and prioritize them accordingly (Osterwalder & Pigneur, 2010). To identify the Revenue Streams, a company must first identify its customer segments, which are the different groups of customers it serves. Then, the company can determine the value proposition it offers to each customer segment and the channels it uses to reach them.

Revenue Streams can take various forms, and they can be categorized into several types:

- **Sales revenue** – This is the revenue generated by selling products or services to customers.
- **Subscription revenue** – This is the revenue generated from recurring payments made by customers for continued access to a product or service.
- **Advertising revenue** – This is the revenue generated from advertisements placed on a company's website, social media channels, or other media platforms.
- **Transaction fee revenue** – This is the revenue generated from charging a fee for facilitating a transaction between two parties.
- **Licensing revenue** – This is the revenue generated from licensing a company's products or services to other businesses or individuals.

By identifying and understanding these different revenue streams, a company can better optimize its business model to generate the most revenue and maximize profit. The importance of revenue streams can be expressed in the following ways:

- Revenue is a Key Performance Indicator (KPI) for any business, and financial analysts need to analyze a company's revenue performance by identifying different revenue streams and interpreting revenue figures on financial statements. The revenue number on financial statements represents the amount recognized by the company when goods or services are sold, regardless of whether cash is received at that time.
- Different revenue streams have varying degrees of predictability, and financial analysts must understand the patterns of cash inflows to observe any unusual movements or changes in revenue trends and identify the causes. Recurring revenue is typically the most predictable income, while transaction-based and service revenues tend to fluctuate with customer demand and seasonality. Project revenue is the most volatile and risky revenue stream as it largely depends on customer relationships, and maintaining these relationships requires significant investment.
- Financial analysts need to develop different forecasting models and carry out various procedures to obtain necessary information, depending on the type of revenue models employed by a company. For

companies with recurring revenue, a forecast model should have a uniform structure and a similar pattern in revenue predictions. For project-based revenue streams, the forecast model should be continuously modified to produce an accurate forecast, taking into account the latest project opportunities and various risk factors.

In the context of carbon farming, farmers have an array of revenue streams available to them, offering opportunities for financial returns while fostering sustainable land management. By capitalizing on agriculture products with carbon certificates, accessing government subsidies and grants, receiving agri-environmental payments, developing value-added products, and participating in the carbon offset market, farmers can maximize their revenue potential.

- **Agriculture Products with Carbon Certificates:** one of the primary revenue streams for farmers in carbon farming is the sale of agricultural products accompanied by carbon certificates. By implementing sustainable land management practices that sequester carbon or reduce greenhouse gas emissions, farmers can enhance the value proposition of their products.
- **Government Subsidies and Grants:** these financial incentives are designed to support the adoption of sustainable land management practices and mitigate the costs associated with implementing carbon farming techniques.

4.6 Module 6: Further development of entrepreneurial skills

Module 6 provides supporting materials for the second round of the acceleration program for the selected 15 participants. Support services in the following areas will be included: marketing and brand development, evidence-based decision making, negotiation and financial planning.

Marketing and brand development - Brand development is a strategic process that involves creating and differentiating a company's style, offerings, and services. This process involves differentiating the identity and services from competing companies. Development includes goal alignment, communication, and market promotion. Brand development in the context of CF certification refers to the process of building and promoting a strong and recognizable brand identity for certified carbon farming (CF) products or services. Brand development involves creating a unique and compelling brand identity that conveys the values, benefits and credibility associated with CF certification. The goal of brand development in CF certification is to differentiate CF certified products or services from non-certified alternatives on the market (Kotler, 2016).

Evidence-based decision making (EBM) emphasizes gathering and paying attention to data, understanding the best current theory about the subject of a particular decision, and continually updating both theory and evidence as new information becomes available. Though this approach seems like simply applying common sense, in practice it requires a different mind-set than is common in most organizational management.

Negotiation is a process of reaching a mutually beneficial agreement between two or more parties who have different interests or goals. Soft skills play a vital role in successful negotiations. Some important soft skills for negotiation include: communication; active listening; emotional intelligence; expectation management; patience; adaptability; planning; integrity; rapport building; problem-solving; decision making; persuasion.

Financial planning for entrepreneurs refers to the process of managing and organizing the financial aspects of a startup or entrepreneurial venture. It involves creating a comprehensive strategy to effectively handle the financial resources, financial analysis, budgeting, cash flow management, financial projections, forecasting, risk management and decision-making to support the success and sustainability of the business. Financial planning for entrepreneurs is essential for ensuring the financial stability and growth of the business. It provides entrepreneurs with a roadmap to allocate resources effectively, make informed financial decisions, and navigate the challenges and opportunities that arise throughout the entrepreneurial journey.

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