Interreg
CENTRAL EUROPE

Co-funded by
the European Union

Carbon Farming CE

REPORT ON THE UPSCALING OF CARBON FARMING BUSINESS MODELS

DELIVERABLE D.2.4.1

March 2026

CONTENT

INTRODUCTION AND SCOPE OF THE TASK

Deliverable D.2.4.1 ‘Report on the upscaling of carbon farming business model’ is related to work package 2, which is focused on testing and upscaling carbon farming cooperation model in 9 Central European countries. This report is based on the testing phase of cooperation model, summarising the results and effects of 10-month, follow-up upscaling period of the tested business model.

According to the Carbon Farming CE project's main mission, because there is a huge potential of carbon farming but is still underused in Central Europe, the project wants to change this and make regions more familiar with the concept, by adapting and testing various farming techniques and cooperation models, and developing a monitoring tool for transnational, standardised carbon sequestration.

To better understand and describe cooperation models in the field of carbon management, it is necessary to have a picture of the nature of value creation, the motivations of farmers and buyers/consumers, the relationships between the interacting parties, the resources required, the market processes, the financial returns, the management issues and the sustainability aspects.

In the case of our project, we focus primarily on the nature of the collaboration between the partners involved, with a focus on the actor who takes the lead in initiating, creating and implementing the model. From this approach we can also observe several types of cooperation between economic actors, as in many cases the process remains within the agri-food value chain, in other cases actors from different economic sectors cooperate with each other, while in other cases governmental organisations are the initiators and main facilitators of the models, or are led by professional organisations and projects whose main interest is in knowledge transfer and advisory support.

With identification, development, testing and upscaling different types of cooperation model, the project would like to reach farmers, SMEs, NGOs, public institutions (schools, health, environment…), decision makers and agriculture support institutions. The ultimate goal for involving these target groups, is to influence on behaviour of stakeholders and to apply carbon farming cooperation model for carbon sequestration.

At the moment the effectiveness of carbon sequestration, to improve soil fertility, water retention and mitigate climate change, is mostly demonstrated in scientific papers, but rather limited in practice. The next step to enable further transition is by upscaling and demonstrating.

Developing, testing and upscaling testing carbon farming cooperation model can be used as an example and source of inspiration for similar future initiatives. The dissemination of these examples to the different economic actors, authorities and consumers will increase their awareness of the potential of carbon farming once incorporated in the agrifood production process.

FROM TESTING TO UPSCALING COOPERATION MODELS - REVIEW AND BACKGROUND

As a preliminary measure in the testing phase (summarised in deliverable D 2.1.1, including the detailed description of the cooperation models), the project partners were required to identify a pertinent carbon farming model within their respective countries with which they could establish some form of affiliation. This can range from the initiation and launch of a new type of cooperation, to the establishment of a link and be involved with an existing cooperation, to the assumption of an external support and evaluation role. The testing period was initially planned to last for a period of one year, with the activities to be conducted during this time being planned by the partners.

At the conclusion of the testing period, each partner prepared an evaluation of their model in a standardised, common structure. A transnational peer review has been carried out by one expert in each country. In each instance, the testing reports and evaluations prepared by the partners were reviewed by the expert in the country concerned, within the context of the project as a whole, and provided feedback on the cooperation model. The peer review covered the main aspects of the cooperation model, the role of the stakeholders, the evaluation of the results achieved, the long-term viability of the business model and its potential for improvement The project partners then used the peer feedback to finalise their case descriptions, and for preparation for the upscaling phase.

Table 1: Overview of the originally tested models, also indicating the type of cooperation

Short title	Country	Territorial	Evaluation	Coop type	Partner role	Ag practice
Josephbrot	Austria	Regional	Result	In agri-food	Init, implement	A1, A2, B1, B2
Eco-scheme	Croatia	National	Action	Government	External	A1, B1, B2, C1
ZERA	Czech R	National	Result	Knowledge	Init, implement	A1, B2, C1
LeguNet	Germany	National	Action	Knowledge	Init, implement	B2
BlackSoil	Hungary	National, EU	Result	Out agri-food	Implement	A1, B1, B2, C1
Agape	Italy	Regional	Action	Farmer led	External	B1, B2, C1
GR-CaNM	Poland	National	Action	In agri-food	Implement	A1
CF label	Slovakia	Nationa, EU	Action	Out agri-food	Init, implement	B3, C1
C-Smart flour	Slovenia	Local, regional	Result	In agri-food	Init, implement	B1, B2, C1

In the upscaling phase, an open call for participation at upscaling carbon farming cooperation model were published in each of the regions, inviting existing and future farmers, SMEs, public institutions and other stakeholders to participate at CO2 sequestration. Applications were assessed by partners and successfully applicants received full support by project partners and 10 months mentoring for successful implementation. This report summarises the findings from the implementation of the upscaling phase in the project countries for the models that were tested. It also explores the changes that occurred in the cooperation model and the lessons and experiences that can be drawn from the process.

UPSCALING PHASE COUNTRY SUMMARIES

AUSTRIA

Model type: "within the agrifood chain" evolved into "outside of the agrifood chain"

From testing to upscaling: the evolution of the tested model

Major changes of the business model were necessary during the upscaling phase due to a lack of financial security on the one hand and difficulties with upscaling the tested model on the other. To counter both problems, new roles were defined within the business model cooperation, a different set of methods was introduced by the new partners, and the model type itself changed from "within the agrifood chain" to "outside of the agrifood chain". The new upscaling process focused on identifying a proper financing mix including sponsoring and crowdfunding in an early model phase to improve its stability and sustainability. Carbon Farming Technique B.4 Agroforestry was chosen as the suitable technique as an inclusion of all stakeholders are crucial to generate fundings privately. Planting hedges and trees on arable land is the most visible and understandable technique of carbon farming for non-agricultural stakeholders. After the physical implementation (trees and hedges are planted) and first scientific data collection the financial funding mechanism shifts from private sponsoring to a "blended finance mix", including private and public funds until the generation of CO2-certificates for the voluntary carbon market (VCM) can be generated by the business model cooperation itself. The operative roadmap consists of five phases:

1. Planning and preparation (stakeholder dialogues, baseline data collection)
2. Financing I ("boost" acquisition to cover early investments and project management)
3. Implementation (physical planting and monitoring)
4. Preparation of certification (identification of suitable standard and certification body)
5. Financing (Selling CO2-certificates on VCM or – then – nature credits)

New participants were recruited as a result of several project activities: First, external expert David Luger of Bio Austria was found for the evaluation of the testing phase. Before the national round table of the project, invitations to potential national stakeholders were sent, such as federal representatives, scientists, companies, agricultural and sustainability advisors and farmers. At the event several participants showed more or less interest in establishing new and sustainable carbon farming business model cooperations. Klimaschutzakademie (KSA) took a leading role in the intensive discussions during the event. After the event Bio Forschung and Mr. Luger reflected the discussion and selected KSA as a potential partner to upscale a new and improved carbon farming business model. Besides KSA, several farmers showed interest - despite a general scepticism - in taking part at a new cooperation, but a new approach of model had to be created first.

Activities during the upscaling phase

KSA was commissioned to do research and create a finance mechanism that prevent farmers from high risks, investments and liabilities within a carbon farming business model cooperation. Bio Forschung and Bio Austria were commissioned to ensure scientific accuracy and evaluate suitability of finance mechanisms for agricultural use in an experimental setup. Finally, one pioneer project with one farmer ("experimental setup") was prepared based on the new model to test it's suitability. The main activities during the upscaling phase were:

- Research of existing private finance mechanisms: to avoid financial barriers (such as in testing phase)
- Research of existing certification standards to plan properly for implementation of the model
- Development of a suitable financing mix for carbon farming business models to avoid financial barriers (blended-finance mix) until market readiness
- Research and data collection of costs and criteria for proper planning implementation of an agroforestry system
- Evaluation of suitability of financial and certification for carbon farming business model
- Planning and preparation of a pioneer business model cooperation implementation – to start business model when financial mix is secured and to create a pilot case for others to refer to.

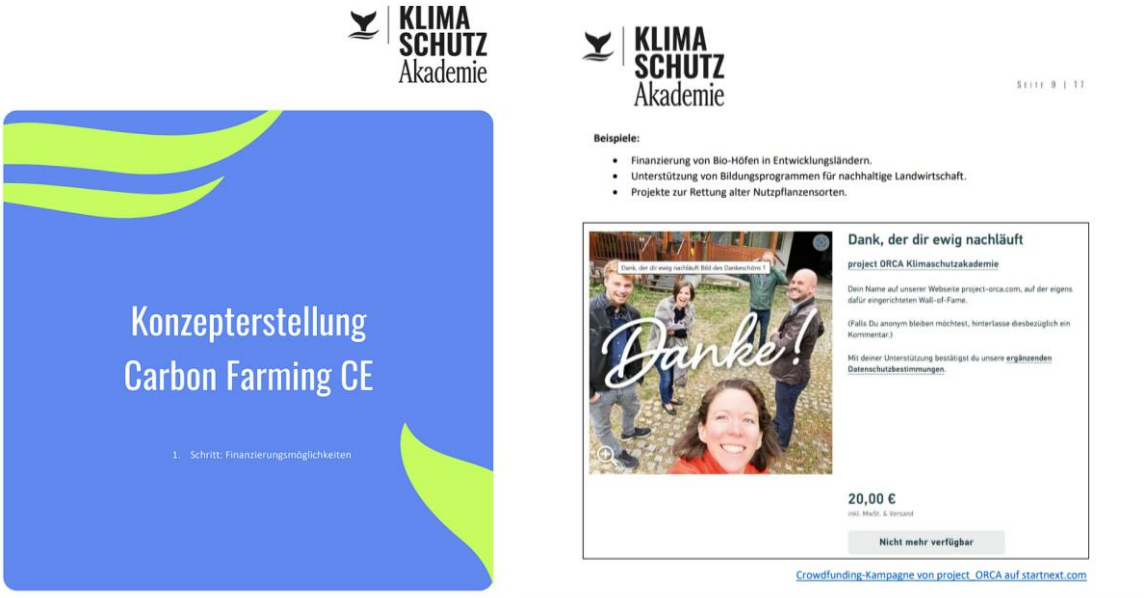

Figure 1: Experiences and lessons learnt, participant's feedback.

Experiences and lessons learnt, participant's feedback

In general, the different expertise from different points of view (especially sustainability consulting of non-agricultural companies) supported a more holistic and resilient approach to find a scalable business model cooperation. Communication and project management worked well in the 4-headed new-found team to lead into a multiple use approach. Along with the experimental setup of a pioneer agroforestry use case, an investment and partnership model was developed that defines quality criteria for planning, planting, maintenance, and monitoring an agroforestry system. The experimental setup serves not only for ecological testing, but also for the structural preparation of a model that:

- enables transparent participation by companies,
- makes environmental performance measurable and reportable,
- could potentially allow for integration into certification or nature credit systems.

The claim of certification suitability turned out to be highly challenging in early project phases, as all criteria for (later) certification must be taken into account from the very beginning of a cooperation model. This is especially tricky for the certification criteria "additionality": stakeholders must explain that CO2 removal could not have happened without the (early stages of the) business model, which will be funded differently than later stages in our model. Exact and professional documentation will be necessary, which is a main task of the business and scientific stakeholders in a cooperation as it exceeds a farmers responsibility and knowledge.

Internally the series of "how to start" and "how to proceed" was a tough decision: Is it more useful to start the business model cooperation with an actual pioneer experimental site project to learn from or to improve theoretical baseline research and planning first to avoid possible boundaries at the implementation phase?

Finally, the model stakeholders decided to improve planning and preparation first before establishing an experimental setup for the new cooperation model, although a suitable financing mechanism for implementation has already been found. The decision to wait with the implementation was ultimately driven by scientific questions of the suitability for an experimental site of identified fields as well as legal questions of possible changes in land ownership. Both issues are possible challenges with the implementation of this model.

Bio Austria, David Luger: The different backgrounds of the partners helped to assess realistic carbon farming business model scenarios that fit into multiple finance instruments and define criteria for high ecological impact and scientific validity. Furthermore, the continuous exchange with different stakeholders such as farmers, companies and researchers throughout the project has established a good base for further cooperation

Klimaschutzakademie (KSA): It was very valuable to have such a blend of people and backgrounds in the room. It helped better understand the needs of the ultimate users and the limitations of the ideas. The process also supported the creation of mutual understanding of different stakeholders, and what would be needed in further projects to bring together farmers and companies.

The business model's future viability and sustainability

Outlook and plans for the future must be described as “bright”. A boost finance acquisition has been identified and application for it has been prepared to ensure early-stage financing for the implementation of a pioneer experimental sites to test the new, scalable, cooperation model. At this stage no marketable products (CO2-certificates) are demanded. A pioneer farmer and several fields for pioneer experimental sites have been found, which is difficult at this stage without references of other “best practices”. Research has been done and preparations are done to avoid possible “traps” of later certification such as the “additionality” of CO2-removal since certification. A detailed evaluation of certification process will be necessary in correspondence with recent and future developments of legal frameworks such as Carbon Removal Certification Framework (CRCF). Once the first pioneer business model is implemented fully, upscaling of the cooperation model with other already excited farmers can start.

CROATIA

Model type: “Government-led”

From testing to upscaling: the evolution of the tested model

The business model in Croatia changed slightly during the upscaling phase compared to the testing phase. During the testing phase, it was observed that financial incentives provided through eco-schemes do not always fully cover the costs or risks assumed by farmers when transitioning to more sustainable production models. As a result, additional forms of government financial support were integrated into the business model during the upscaling phase. These included additional instruments of the Common Agricultural Policy, such as coupled payments and IACS rural development measures.

These changes also led to a transformation in the structure of cooperation among stakeholders. New roles were introduced, particularly in the areas of advisory services, administrative support, and planning applications for various support measures. The role of the government as the initiator of the model remained unchanged, as did the role of farmers as beneficiaries of support schemes. However, the scope of the use of financial incentives and knowledge transfer mechanisms provided by the government expanded, while the AIO team assumed the role of advisor and promoter for farmers. At this stage, the success of the business model was not assessed solely based on the financial viability of implementing eco-schemes for farmers, but also on the acquisition of new knowledge and practices by government bodies and agencies necessary for the effective implementation of sustainable production systems. Consequently, the collaboration model evolved from a simple system focused exclusively on eco-schemes into a more complex and integrated framework that simultaneously ensures financial sustainability and encourages farmers to steer production towards more sustainable agriculture.

Activities during the upscaling phase

An open call for applicants was published on the official website of the Agricultural Institute Osijek, which targeted local farmers representing a wide range of primary production types, including arable farming, livestock production, fruit growing, seed production, vegetable production. The public call specified that participating farmers would receive continuous advisory support from the AIO project team throughout the implementation period. A total of four farmers applied, representing arable, livestock, and seed production systems, all of whom expressed an interest in innovative and sustainable farming practices, including carbon farming approaches. The role of the newly recruited participants was to implement the carbon farming business model on their farms, provide practical input and feedback, and cooperate closely with the project team during monitoring and documentation activities.

Figure 2: Meeting with representative of OPG Miladinović Mirko.

The main activities implemented during the upscaling phase:

- Meetings with farmers: Meetings with farmers enabled the most effective insight into the current situation on farms directly from the farmers themselves. During these meetings, questionnaires were administered covering past, current, and planned use of government support schemes, as well as the acquisition of new knowledge through workshops and training sessions organized by public authorities.
- Questionnaires and interviews: Through questionnaires and interviews, feedback was collected on the effectiveness of previous applications for various government support measures, future development plans, and participation in workshops and training activities.
- Advisory activities: Based on the information gathered through questionnaires and interviews, the AIO team provided targeted advisory support to assist farmers in selecting appropriate eco-schemes and other support measures, taking into account their type of production, farm size, experience, and other relevant factors. Farmers were also informed about workshops and training sessions organized by public authorities, enabling them to make full use of available opportunities to acquire technical, theoretical, and administrative knowledge beneficial to their daily operations.

- Supporting materials: Farmers were provided with supporting materials developed during previous activities of the Carbon Farming CE project, serving as practical guidance for carbon farming techniques and cooperation models implementation.
- Farm promotion: Farmers voluntarily agreed to join the Central European Carbon Farming Cluster. Upon receiving official promotional labels, these will be awarded to the farmers who participated in this activity, further increasing the visibility of both the farms and the project.

1. WORK PACKAGE 1 - Summary from D.1.1.1

1.1 Carbon Farming Techniques Tested in the Project

1.1.1 External Organic Fertilizers

Manure

Organic fertilizers add carbon (C) to agricultural soils, improving soil health and productivity. Sources include on-farm livestock production or cooperation with neighboring farms/biogas plants trading in alfalfa, clover-grass, straw, or substrate. Forms include solid (compost, solid manure) and liquid (slurry) types; granulates differ in grain size. Compost and solid manure are spread; slurry is applied with trailing shoe applicators or shallow injection to ensure quick infiltration and reduce N_2O losses. Avoid hot, dry weather (especially with band spreading) and apply during high soil microbial and plant activity. Store fertilizers to limit C, ammonia, and N_2O losses. EU and national laws set nitrogen limits by crop, soil nitrate/ammonium content, and yield potential.

1.1.2 Relocation of Harvest Residues

Clover-grass improves soil stability and fertility, which can also be beneficial for farms without livestock. Residues like fresh alfalfa or clover-grass can be mulched, composted, or traded for manure. Stockless farms may mulch young crops (maize, sunflower, pumpkin, potato) with alfalfa cut in mid-June at a rate 70-140 m^3/ha. Cooperative nutrient exchanges work well—e.g., 1 t clover-grass silage

3

Alfalfa mulch

for 1.2 t manure or 2.35 m^3 slurry. Residues can be aerobically composted (heaps/windrows) or anaerobically converted (covered heaps, microbial carbonisation). In dry areas, ensure enough moisture and N-rich material; in wet areas, ensure airflow or C-rich material. A mix of ~2/3 C-rich and 1/3 N-rich substrates is recommended. Farms without cattle can use meadow hay as fertilizer, incorporating it before cover crops.

1.1.3 Additional Cover Crops

Peas instead of fallow

Cover crops require the same care as main crops. Use proper sowing techniques for correct depth and select species suited to timing and conditions—e.g., sorghum or sunflower for early hot months (July-Aug.), radish or enduring crops for later sowing (Sept.-Oct.). Mix species with diverse root systems and temperature/moisture preferences for better emergence. Avoid sowing in extremely hot, dry periods; better results occur after drought when there is rain or dew and soil is suitable. Alternatively, undersow in spring to use shade and cooling from main crops. To combine summer and winter benefits, sow winter cover crops into summer ones in October.

4

Figure 3: Material distributed to farmers - Brochure from Transnational train the trainers winter school.

Experiences and lessons learnt, participant's feedback

Overall, scaling up the government-led cooperation model proved to be challenging due to the inherent characteristics of the model and the government's role as the initiator of cooperation. The upscaling process was largely one-directional, with farmers primarily engaging in the use of financial and practical benefits provided by the government, namely through relevant ministries and agencies. Through its advisory support and guidance, the AIO team elevated the level of cooperation between farmers and public institutions, particularly by enabling broader and more timely use of available support schemes and services.

Farmers' motivation to enhance cooperation was mainly driven by financial benefits, but also by the acquisition of new knowledge, improvements in soil fertility, and the overall transition of farms towards more sustainable and climate neutral production systems. During this phase, some farmers discontinued eco-schemes implemented in previous years due to changes in production practices and their lack of economic viability, while others introduced additional eco-schemes after identifying

opportunities for both financial and environmental gains. Young farmers benefited from additional support measures, and all four participating farmers attended training sessions and workshops organized by the Ministry. With the support of the AIO team, farmers also successfully applied for compensation for drought-related damage and received payments within a notably short timeframe, thanks to the timely submission of accurate documentation.

Certain challenges emerged as a result of the modernization and acceleration of application, control, and production monitoring processes implemented by public authorities. While the digital submission of documentation represents a significant time-saving advantage for younger farmers, it is often perceived as a barrier by older and less technologically proficient farmers. Moreover, as the scope of government support utilization increases, administrative workloads also rise. Some farmers pointed out that staff of the Paying Agency for Agriculture, Fisheries and Rural Development do not always possess sufficient practical knowledge of on-farm conditions and production facilities, which can complicate the preparation and validation of documentation required for subsidy payments. Also, not all crop types are numbered and classified in the Agronet system, which creates difficulties for some farmers when registering the cultivated crops on specific plots. In summary, younger farmers and operators of larger farms perceive cooperation with public institutions and the use of available support measures as highly positive, whereas older and smaller-scale farmers view certain changes as obstacles, and in some cases as a systematic attempt to discourage them from continuing agricultural production.

Main points from the participating farmers are:

- Support scheme system can be overly complex and insufficiently clear for end users. Government schemes need to be more targeted, particularly with regard to carbon farming.
- Administrative requirements do not reflect the real-life circumstances of farmers, regulatory inconsistencies place an additional burden on farmers and discourage them from organising their production in a more rational and efficient way.
- The role of knowledge transfer is extremely important, as is the role of agricultural advisors.

The business model's future viability and sustainability

The model will continue to rely on an integrated approach combining financial incentives, advisory support, and knowledge transfer to enable the adoption of sustainable farming practices, including carbon farming. Cooperation with government institutions is essential, as agricultural production in Croatia is largely not economically viable without support, despite its high strategic and societal importance. Therefore, maintaining and further developing structured collaboration between farmers, advisory bodies, and public authorities remains a key prerequisite for the sustainability of the model. At the same time, the sustainability of the cooperation model will be strongly influenced by forthcoming changes in the EU's Multiannual Financial Framework (MFF) and by new regulatory frameworks following CAP 2027. These changes are expected to have a significant impact on the availability and structure of support measures, making adaptive governance and continuous policy alignment essential for the long-term viability of sustainable climate neutral agricultural production in Croatia.

Figure 4: Meeting with representative of OPG Koprivanac Marko.

CZECH REPUBLIC

Model type: „Knowledge-transfer oriented"

From testing to upscaling: the evolution of the tested model

In this adoption of the "Knowledge transfer" type cooperation model, it has started with a simple scheme: ResearcherßàAdvisorßàFarmer as defined by the project task. In the next step, a simplified scheme was introduced, by skipping the Advisor's mediation – thus changing the primary scheme into Researcher ßàFarmer. At the same time, the "Advisor pathway" was kept as a parallel option, if such opportunity appears.

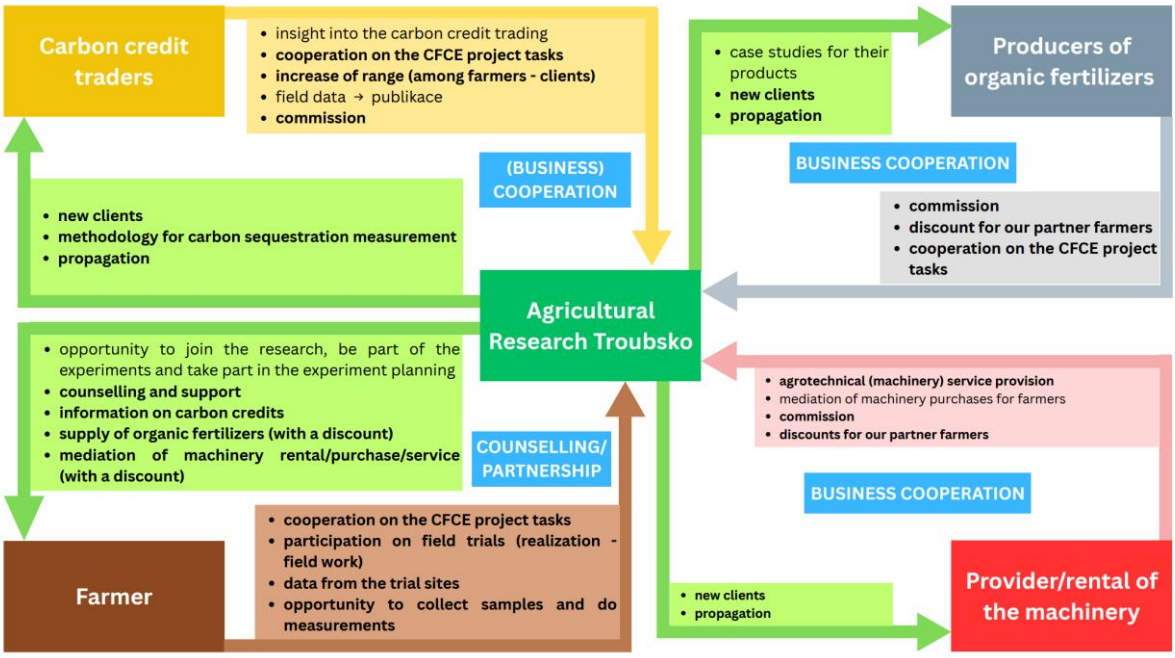

Figure 5: The detailed business model scheme in the Czech Republic.

Later, after making contact with various agrisector-related companies, especially those focused on production of organic preparates and carbon credit traders, but also providers or renters of specialized machinery, the scope of potential action was broadened by including more subjects as optional branches of the scheme. By establishing collaborations with such companies, the Researcher gains the ability to further support the Farmer by provisioning, recommending or directly supplying products necessary, or beneficiary for implementation of carbon farming methods.

Activities during the upscaling phase

The principle and aspects of the business model have been explained and presented to potential participants on several occasions of mass events organised/attended by ART – such as the National Round Table, or agricultural exhibitions and field days. On the top of that, ART has been actively approaching companies or individuals considered suitable for the business model and staged meetings with them. During these, ART presented the business model and the context of the Carbon Farming CE project (CFCE) and offered them participation in the business model. Then the potential and aspects of such cooperation were discussed – with some, ART has later realized activities following the scope of the business model.

Considering multiple institutions and individuals ART has worked on with, there were several unrelated activities ART have engaged in:

- In the first case, ART has agreed on research collaboration with a farmer interested in cover crops. ART has established an experiment examining ten different cover crop species on his fields. The different cover crops were compared according to their potential to cover the soil and maintain or enhance desirable soil properties, such as nutrient concentrations, water content, carbon soil etc. For evaluation, soil samples were collected and analysed after termination of the experimental cultures.
- In the second case, ART has agreed with another farmer on a research collaboration. In the first step, initial soil samples have been collected on the fields considered for experiments, to evaluate the original state of the soil. Currently we are negotiating and discussing the particular designs and focus of the experiments.

Figure 6: Soil sample collection on the experimental field of a collaborating farmer.

- Besides these experimental activities, ART has forged a partnership with Agricultural Knowledge and Innovation Institute of the National Rural Network of Slovakia (IZPI), which offers advisory and educational services to farmers. Within this collaboration, ART has organised an online seminar "Carbon Farming: opportunity of today, necessity of tomorrow" on 16th of February. This seminar was attended by more than 60 participants, majority of which were farmers. During the seminar, carbon farming as a whole was presented, including the CFCE project and several techniques relevant for the topic, which have been studied at ART for several years. In addition to the educational format of the event ("transferring of knowledge"), the participants have been encouraged to reach ART for further collaboration or counselling if interested.
- On 24th February 2026, a seminar for farmers was held at ART, where carbon farming and CFCE were presented among other topics. Call for participation on the carbon farming business model was included. Nearly 40 participants consisting of farmers, advisors and professionals attended.
- On 5th March 2026, an online presentation of carbon farming and the CFCE project given by ART took place during the EUFRAS Coffee Break sessions. EUFRAS (European Forum for Agricultural and Rural Advisory Services) is a European advisory network regularly organising public sessions on actual topics in agriculture (EUFRAS Coffee Breaks). ART agreed with EUFRAS representatives to give a talk about carbon farming related topics during one of them. It was an excellent way to approach farmers and experts across Europe, significantly increasing the potential for knowledge transfer and raising awareness in the process.

Experiences and lessons learnt, participant's feedback

ART has entered the upscaling phase with a broadly elaborated scheme with a lot of potential pathways and pending possible situational collaborations. It was a bit of a challenge to identify the most promising directions and focus on them. After that however, when the most functional partnerships emerged, things have mostly worked well. In some cases, the action was taken faster (as in the case of the first farmer), in some other cases, more time was necessary and the progress was not as rapid.

Regarding the experimental collaborations with the farmers, it is necessary to discuss the matter with the involved farmer thoroughly, in order to compare each other's information, focus and experiences. Then it is a delicate matter to plan a profound experimental design aligned with the interests of the researcher and following the focus a capability of the farmer at the same time.

In case of the educational activities, it took some time to meet and discuss the format of ART's partnership with IZPI, but the negotiations were smooth, clear and friendly, they co-organised the said seminar quite fast. While presenting the scheme and recruiting participants and partners for the business model, ART has experienced both positive and negative response. Some people, especially among the farmers, were rather sceptical – however its noteworthy they were mostly sceptical towards carbon farming as a whole, or specifically towards carbon, rather than towards the current model in particular. Some individuals regarded the model as promising, but were a bit hesitant to join

it, or had some concerns about its practical feasibility or impact. On the other hand, all the previously mentioned partners are enthusiastic about the problematics and working with together has been a pleasure.

Figure 7: Presentation on carbon farming during the practical seminar.

The business model's future viability and sustainability

In this moment, several of the discussed activities are still underway – especially in the case of the second collaborating farmer, more joint experiments will likely follow in next years. In the matter of the partnership with IZPI, both institutions were content with the recent online seminar and are open to further cooperation in the future. Considering the swift and fruitful action during the seminar organisation, this can be considered as a very promising way to other future educational activities and events.

Both of the seminars, the online one on 16th February and the one on 24th February brought a very convenient way of approaching multiple farmers and advisors at a time and posed as a great opportunity to approach new potential partners for future field experiments tackling carbon farming-relevant techniques.

GERMANY

Model-type: „Knowledge transfer-oriented"

From testing to upscaling: the evolution of the tested model

The ÖBG/Germany has set up a project-led, knowledge transfer-oriented model, called LeguNet-Carbon Farming. For the upscaling activity in A.2.4, the original small cooperation between members of the two projects was expanded and the scope was widened. In the given time ÖBG tried to expand the cooperation to a network (22 participants), which included more farmers. This was a requirement of the external expert/peer reviewer Dr. Judit Berenyi Üveges at the stage of testing the cooperation model. Furthermore, ÖBG expanded the scope of the initial model, which was first directly confined to the participants of the two projects 'Carbon Farming CE' and 'LeguNet'. The after all resulting network (which still is in its initial phase with a low number of members) was then called 'Leguminosen-Carbon Farming Netzwerk' (translated 'Legumes-Carbon Farming network') and followed all impact of growing legumes (particularly innovative grain legumes) on carbon sequestration and using these benefits as labels, quality proof and sales argument in the whole value chain.

Activities during the upscaling phase

Twenty-two new participants were gained. The upscaling of our knowledge-transfer related model aimed to build up a wider audience, a wider group of participants. They then can be reached to be informed about new events providing knowledge and can communicate and set up contacts and business relations as needed to strengthen the focused value chain. To gain the new participants following approaches were run:

- A short descriptive article with a link for the online registration in the Naturland Newsletter of March 2025 – reaching mostly farmers.
- Individual mailing to 26 selected and potentially interested companies, dealing with legumes in trade or processing.
- An on-site presentation (by Dr. Bettina Faehnrich) at a local Carbon Drawdown Initiative – reaching mostly scientists and students.
- A short descriptive article in the Naturland Newsletter of December 2025 – reaching mostly farmers.
- An on-site presentation (by Dr. Bettina Faehnrich) at a greater agronomic event (Öko-Ackerbautagung Süd) in January 2026 – reaching mostly farmers and consumers.

Snip of All registered participants were collected, forming the start of a network. The answers of the registration questionnaire were checked, results (e.g. about the level of knowledge, the need and interest of support for business cooperations, etc.) elaborated and are provided for further expansion.

The approach was to build up a network of all participants along the value chain of growing legumes, processing them, trading them, consuming them – in the conscience of the additional carbon sequestration effect and using this knowledge a quality aspect. Connecting stakeholders and providing information was the goal.

The activities were to set up a suitable info package with questionnaire and registration form for potential participants. Elaborating and amending these materials throughout the task period. Distributing these materials according to the above-mentioned means. Giving presentations and being available for any inquiry concerning the network, personally, by mail, by telephone, or by online meeting.

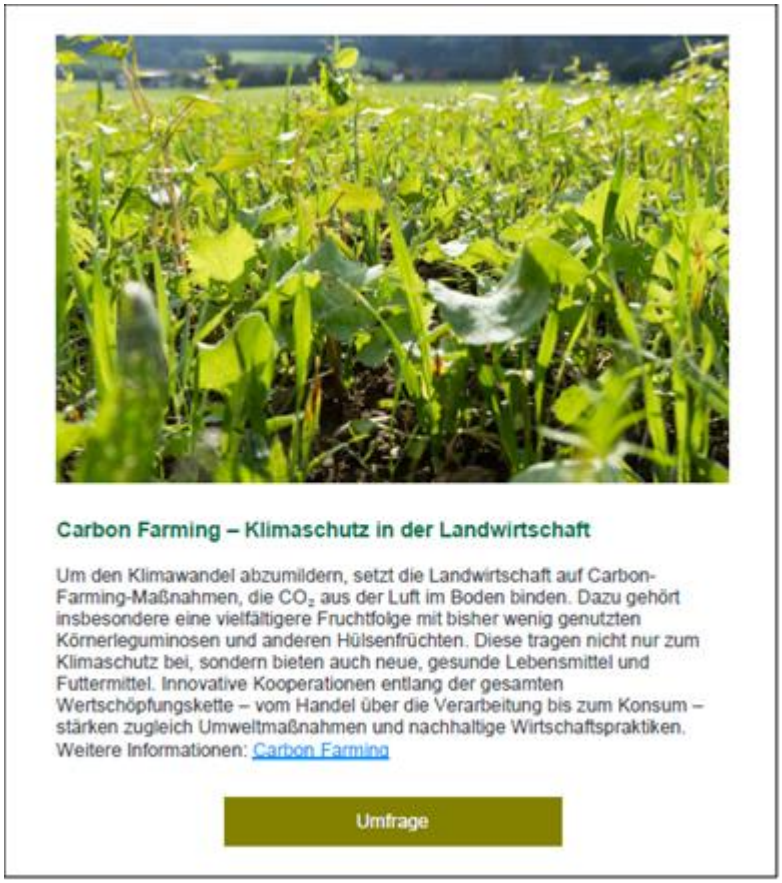

Figure 8: Naturland newsletter March 2025.

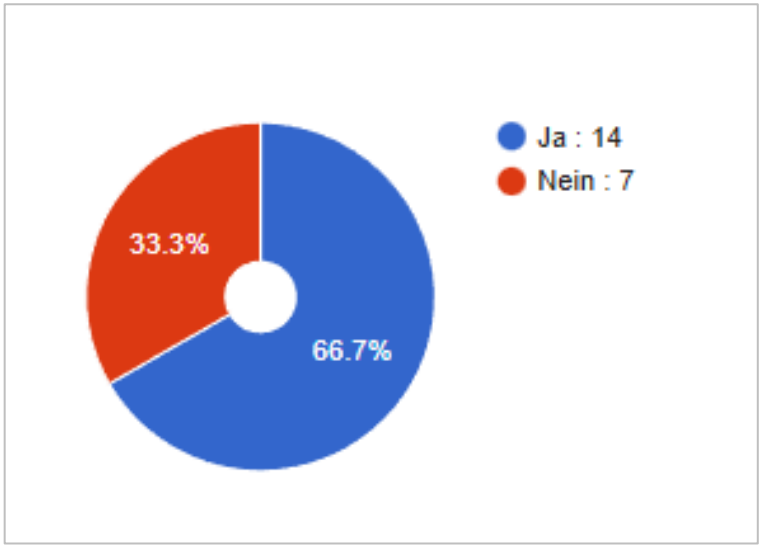

Figure 9: Do you wish support of your business cooperation by the Legumes-Carbon Farming network? Answer: Yes: 14, no: 7.

Experiences and lessons learnt, participant's feedback

The preliminary challenges (and consequently followed by adapted approaches) and lessons learnt were:

- The scope of just including the two projects 'Carbon Farming CE' and 'LeguNet' turned out to be problematic, as the distribution of promoting material in the second project was dependant on the opinion of a couple of decisive people. This slowed the process of network building. ÖBG therefore decided to open the scope towards the general context of legumes and carbon sequestration and could then reach potential participants easily.
- As ÖBG's approach concentrated of combining diverse stakeholders, it was a challenge to reach these because you only can reach them via different channels. This made the task more comprehensive. ÖBG tried to reach stakeholders via online registration forms via online newsletters, but also via personal speech, presentation, discussion and paper hand-outs. Furthermore, we contacted selected stakeholders via individual email.
- In general, there was the challenge to convince about the advantages of the network, to overcome hesitations and concerns. For this reason, ÖBG have a lower number of participants than previously expected and know that even more efforts would have to be taken to expand the network in future.

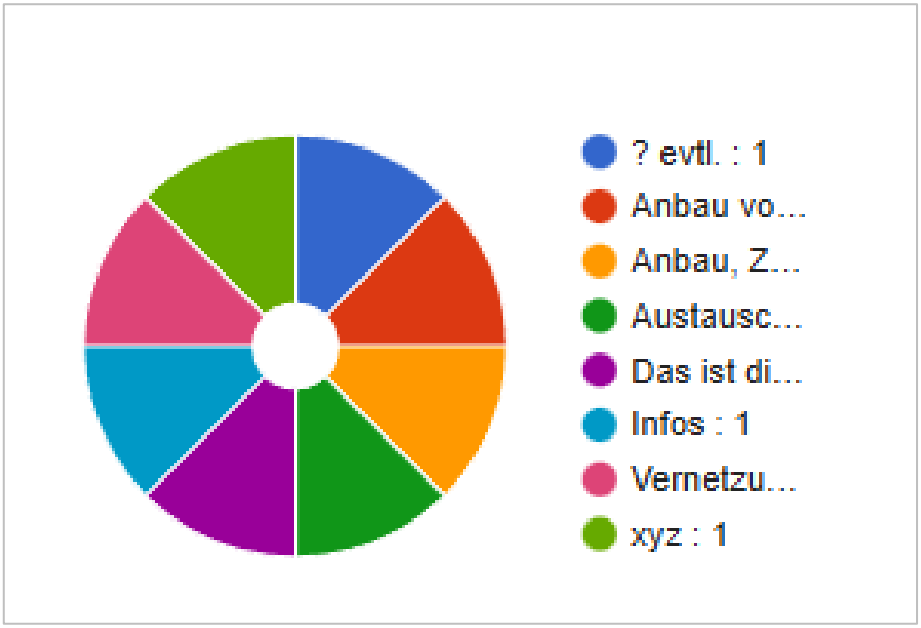

Figure 10: Which kind of support? Answer: cultivation of lenses, processing and marketing: 1, cultivation, timing: 1; exchange and information about effects of different legumes and their cultivation: 1, that's the question: 1, information: 1, networking: 1.

The business model's future viability and sustainability

As the project, and with it the paid resources, end, the outlook of possible additional actions and expansion of the network is limited. Still, it would be good, to make regular round mails, sending information of knowledge-transfer events, and contact lists, to all the recent participants. Furthermore, all efforts to gain more participants for the network, should be continued in the same way we did up to now.

HUNGARY

Model-type: „outside agri-food chain", „government-led" added

From testing to upscaling: the evolution of the tested model

In Hungary, GAK carried out activities within the framework of two different types of business models during the scaling-up process. One of these was identical to the tested business model, where GAK provided professional support to two farmers starting a cooperation with Blacksoil, primarily by handing over the guides prepared within the framework of the project. Also, in GAK's case, the introduction and dissemination of the government-led model was the most practical and common way to help farmers with primary technical and administrative advice, building upon the professional and methodological background developed within our project. Since interest in structured carbon management programs and schemes is still pretty low in Hungary (partly because of the bad reputation of earlier carbon programs), GAK decided to also support another business model in the scaling-up phase, which would allow to achieve a greater impact and involve a wider range of farmers. In the follow-up phase, there was an interest as well for a third model, briefly described in the CE Guide for Carbon Farming Business Models, that is the Advisory service-led type model.

Activities during the upscaling phase

Following the interest and ongoing professional relations with an advisory service provision organisation in Hungary (whose leader initiated the cooperation in response to demand from farmers), GAK focused our upscaling activity at the regional level, working together with this agricultural advisory organization in South East Hungary (Karcag), where, compared to 2024, 44 farmers introduced new agrotechnical practices in 2025 that are eligible for payment under the Hungarian eco scheme support program, 42 of which are practices that have a direct or indirect impact on soil carbon. Five of these farmers had not yet participated in the eco scheme system earlier at all, so they can be considered completely new entrants, who also received the most support.

Title of undertaken practices, their compensation payment value (in brackets) and indication of soil carbon relevance with italic:

- A2 Diversification of crop rotation (1)
- A4 Field size restriction (1)

- A5 Prohibition of the use of substances harmful to bees on arable land (1)
- A6 Use of urea fertilizer on arable land (1)
- A7 Use of microbiological preparations on arable land (2)
- A8 Use of soil/plant conditioners on arable land (1)
- B2 Pastoral or rotational grazing (2)
- B4 Use of alternating scythes only (2)
- C1 Pastoral or rotational grazing (2)

Relevance of undertaken eco-schemes related to soil carbon: Soil and plant conditioners, as well as nitrogen-fixing preparations, have a significant impact on soil carbon content and carbon sequestration processes, including humus preservation and formation, carbon dioxide emission reduction and stability. The main functions of nitrogen-fixing preparations are organic matter replenishment, increasing microbial activity and preventing the pentosan effect and maintaining the organic matter cycle. For farmers, using these practices in the AÖP (eco scheme in Hungary) (on at least 50 % of the area) earns 1 point and additional subsidies are available if a certain number of points is exceeded.

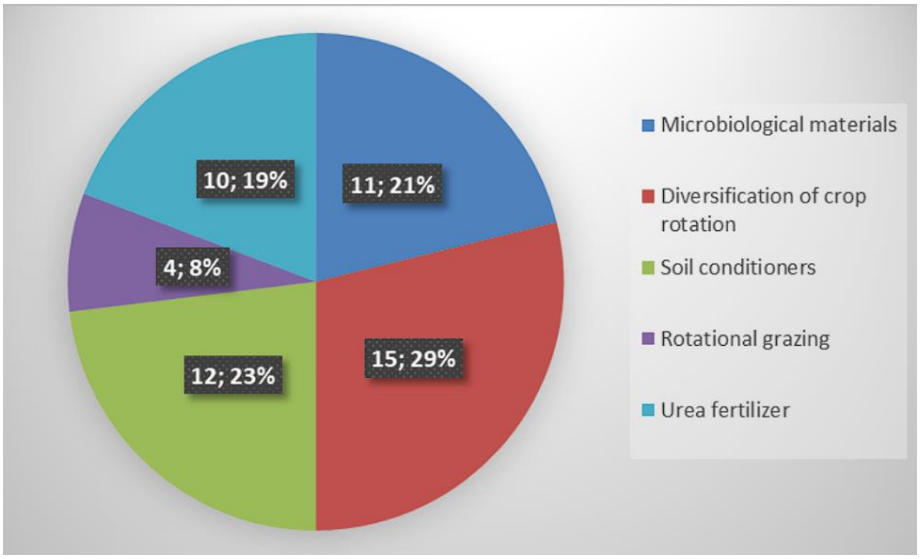

Figure 11: Distribution of new eco-scheme practices undertaken by the 44 farmers.

The main form of support was delivered through the provision of advisory services for the farmers entering into new types of programs, undertaking practices which they haven't implemented before. During the collaboration, GAK provided professional and practical information to help implement the CFCE project's practices. Our advisory service provider partner assisted with the various administrative obligations that are more extensive than usual for eco-schemes. Typical parts of the advisory services:

- Professional and administrative support
- Farm management logbook, E-logbook record keeping
- Using the Mobile Farmer App (e-government platform)
- Handling of single payment scheme, e-claim applications, submission of applications

- Eco scheme, environmental measures applications
- Interpretation of decisions made in support matters, preparation of appeals (with the
- assistance of a legal expert)
- Participation in agricultural administrative matters
- Preparation for inspections
- Explanation and interpretation of legal requirements
- Participation in projects / AEDIH – digitization

After the upscaling period, a short survey was conducted (with almost 50 percent of the farmers filled out), regarding their opinion about the Hungarian eco-schemes (AÖP), the advisory service provision and prospects for the future.

Figure 12: Farmer checking soil health on a regenerative field.

Experiences and lessons learnt, participant's feedback

On the one hand, although changes in environmental conditions and climate are themselves having an increasing impact on management decisions, farmers are essentially looking for guaranteed forms of return and reimbursement where they can be reasonably sure of receiving financial compensation for their efforts. In this regard, the eco scheme and environmental measures/regenerative agriculture scheme financed by EU CAP support are currently the most widespread business models known and used by farmers in 2025.

As our previous experience in Hungary has shown, although the effects of precipitation deficiency and drought are significant motivating factors, the least risky way to try out carbon management practices is through agricultural subsidies. These are practices that are supported and encouraged within the framework of the Common Agricultural Policy (CAP). For most farmers, adopting these practices is closely linked to the advisory process, since advisors carry out the CAP's administrative procedures. In our experience, this model has also proven to be one of the most effective ways of reaching and engaging farmers.

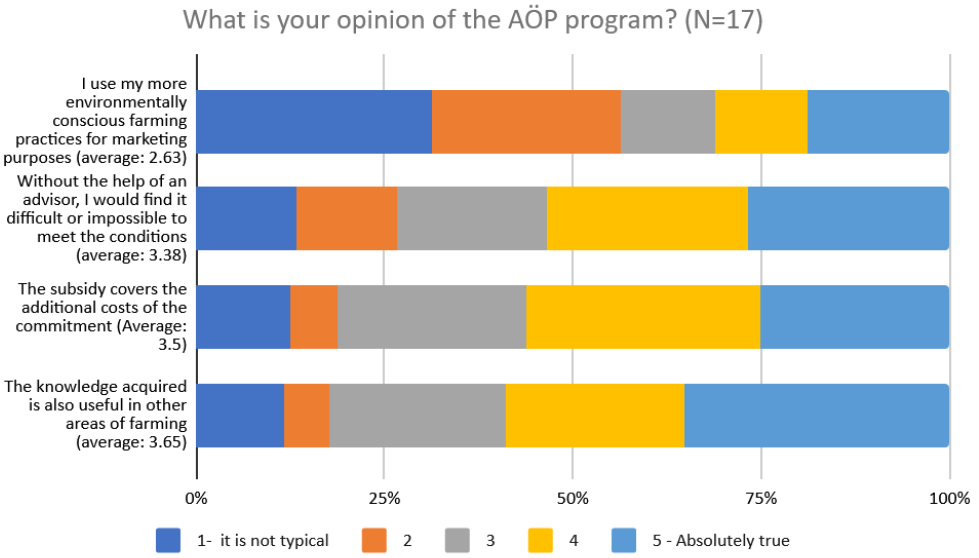

Figure 14: What is your opinion of the AOP program? (N=17)

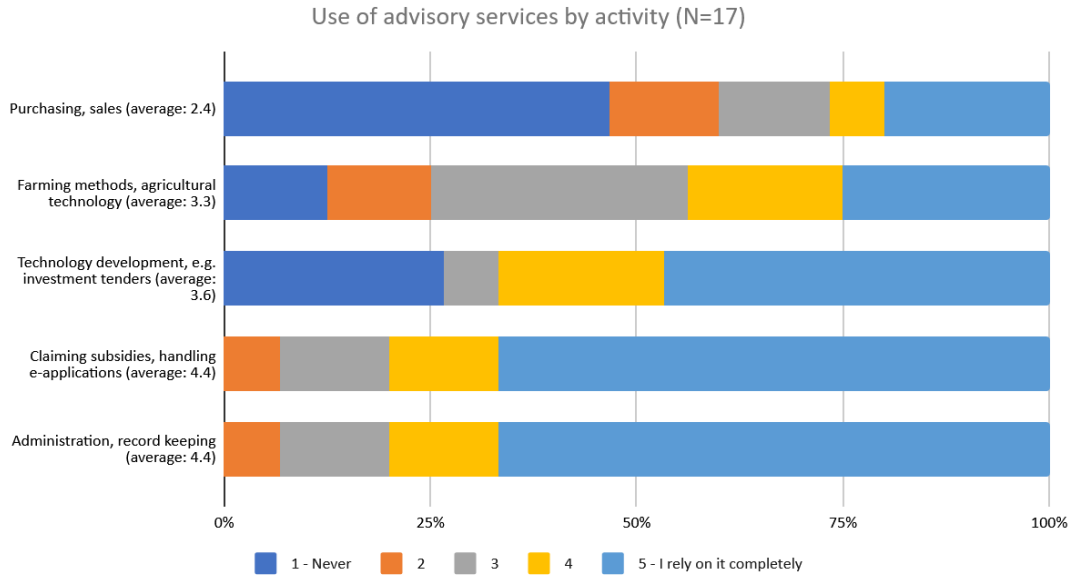

Figure 13: Use of advisory services by activity (N=17).

On the other hand, in Hungary, a notorious carbon management project ran in the first half of the 2010s, reaching hundreds of farmers, basically just making promises and asking farmers to use specific products and technologies, but never giving them any benefits in return. This gave carbon credits an extremely bad image, the effects of which can still be felt today. Rebuilding trust will require a lot of effort, and the lack of a legal regulatory framework does not help the launch of projects such as Blacksoil, which is likely to attract farmers in the short term who are focused on environmental, agrotechnical, and farming benefits, and for whom the currently uncertain carbon credit market returns are not the primary consideration at this stage. In addition to all this, it is worth mentioning once again that, alongside managing carbon credits, Blacksoil offers farmers participating in the programme an extensive portfolio of expert advice.

Figure 15: Farm advisors consulting with a regenerative farmer.

The business model's future viability and sustainability

The government- led model is basically maintained by the EU and the member states according to the programming period interval timeframe, e.g. in the case of AECM / regenerative agriculture, this is 2024-2029 in Hungary. So it is expected that this type of model will be sustained over the next couple of years. According to what we can know about the plans for the EU's 2028-2034 spending cycle, there is a proposal to merge the two existing pillars of the Common Agricultural Policy (CAP), traditionally known as 'first pillar' direct payments and 'second pillar' payments focused on rural development measures, into one single funding instrument called the 'European Fund for Economic, Social and Territorial Cohesion, Agriculture and Rural, Fisheries and Maritime, Prosperity and Security'. As part of this, under the 'National and Regional Partnerships' (NRP) Fund, agricultural subsidies would be merged with other funds into a single system, where AECMs would be merged into one instrument, the Agri-Environment and Climate Actions (AECAs).

In the case of Blacksoil, they are planning up to three so-called horizons, the third horizon reaching 10-years of operation, but the model is currently rather exposed to changes in the regulatory framework and the volatile carbon credit markets. In the case of agricultural advisory organizations,

there was an interest in the possibility and conditions of setting up an independent business model (so creating an "Advisory service led" type of business model). The advisory service driven model concept sits somewhere in between the "Outside of agri-food chain" and "Knowledge transfer/project" type. However, unlike the better-known voluntary carbon market projects, where the benefits for farmers focus primarily on the financial income from the sale of carbon credits and the solid promise of such revenue, the advisory-driven model does not primarily target this, but is rather based on regular agrotechnical, farm management, and administrative (monitoring) assistance provided as part of the advisory service routine, which advisors already carry out as a dominant part of their everyday work. Should the collaboration prove successful in achieving the desired carbon sequestration outcome and be accredited, the financial income from the sale of carbon credits can serve as a supplementary benefit for farmers at the end of the designated period.

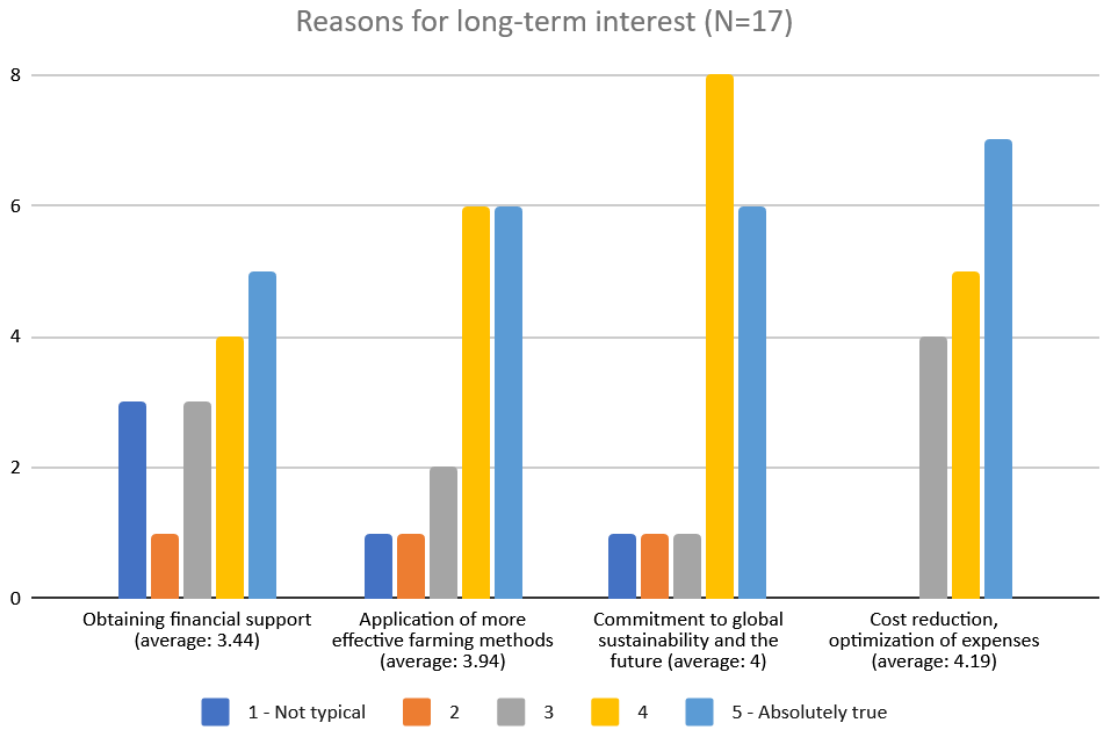

Figure 16: Reasons for long-term interest (N=17).

ITALY

Model type: "within the agri-food chain" / farm-led

From testing to upscaling: the evolution of the tested model

During the testing and upscaling phases, the business model maintained its core structure, with context-specific adaptations for different production systems. The initial model (Activity 2.2) was developed within the agri-food chain, focusing on farms practicing conservation agriculture in Emilia-Romagna, involved in arable crops production. The cooperation involved farmers, producers' organisations, advisors, and Ri.Nova, which acted as a coordinating and bridging actor among all involved stakeholders, including research institutions (e.g. the University of Bologna) and the agricultural sector. In the upscaling phase, the same model was applied to the horticultural context, involving two vegetable crop (e.g., spinach) growers not previously engaged in conservative agriculture and supplying a producers' organisation involved also in the frozen food production.

Figure 17: Meeting to assess interest in the business model and evaluate the suitability of farms for inclusion in the cooperation framework (April 2025).

While the cooperation framework and stakeholder roles were maintained, the applied carbon farming practices shifted from cover crops tested in the initial business model phase to compost and soil amendments, adapting the more suitable best practices to the vegetable crop growing system conditions. The adaptation was necessary to assess the transferability and scalability of the business model beyond extensive arable crops, while preserving its environmental objectives. Ri.Nova acted as a coordinating and bridging actor, supporting implementation, facilitating experimental plots, linking farmers and advisors, and facilitating structured dialogue between advisor and policy maker to increase awareness and support for carbon farming practices. Advisors retained their agronomic role and connection with the producers' organisation. Ri.Nova reinforced the link between research (University of Bologna), advisors, and farmers established in the previous phase, providing scientific support on the best practice application in real field conditions.

Activities during the upscaling phase

For the upscaling phase, new participants included two farmers recruited by a new advisor belonging to a different producers' organisation than in the testing phase. The selection process combined an

open call, published on Ri.nova's website, and invitations extended during events and meetings. The advisor subsequently identified and engaged the two farms, ensuring their suitability for the planned carbon farming practices.

The farmers' role was primarily operational, implementing compost and soil amendment practices, but also participatory, contributing feedback during meetings with Ri.Nova and the advisor regarding practical challenges, benefits, and overall perception of the practices. The advisor was involved not only in agronomic support and farm selection, but also in multiple interactions with research institutions and policy makers, providing input to align practical implementation with broader scientific and regulatory frameworks. Ri.Nova acted as the central facilitator, supporting practice selection, coordinating implementation, enabling trial plots to test different amendment sources, and connecting farmers, advisors, and research partners, including the University of Bologna (UNIBO) for analysis. Compared to the testing phase, the business model was replicated without structural changes, maintaining the cooperative framework between Ri.Nova, farmers, advisors, producers' organisations, and research institutions, with the added dimension of increased engagement between the advisor and policy makers.

During the support and upscaling phase, a series of structured activities were carried out to facilitate the implementation of carbon farming practices and the integration of new participants into the business model. Key activities included meetings, farm visits and on-field support. Meetings to assess interest and align objectives were essential to understand farmers' needs and perspectives and to ensure alignment with the business model and carbon farming practices. These sessions were documented through photos, minutes, and attendance sheets. Farm visits enabled direct discussion on best practices, including the practical implementation of compost and organic amendments, and the organisation of plots for testing different solutions, as well as criticalities on the compost application within the rotation of the crops (e.g., dosage, way of application, timing). These visits provided hands-on guidance and allowed adaptation of practices to specific farm conditions. Documentation included field photos and technical notes.

Figure 18: Discussion with farmers and advisors on implemented practices, practical challenges, and observed effects (August 2025).

Strategic and coordination meetings were also organised to support planning, facilitate dialogue between farmers and advisors, and prepare future steps for scaling carbon farming practices. Engagement with researchers and policy makers took place through dedicated sessions. Advisors met policy makers to discuss carbon farming practices and regulatory developments, while Ri.Nova facilitated exchanges between advisors and research institutions, including the University of Bologna, to address implementation, monitoring, and scientific aspects. These interactions ensured technical robustness and alignment with policy and research frameworks. In parallel, training events contributed significantly to knowledge transfer and stakeholder engagement. A training event on the benefits of organic fertilizers for improving soil quality in carbon farming brought together stakeholders to share project results and scientific evidence, while supporting the adoption of these practices. Events based on this model can be continuously replicated to ensure ongoing knowledge transfer and the progressive mainstreaming of good practices.

Each activity contributed to supporting participants by providing practical guidance, fostering knowledge exchange, and strengthening integration within the cooperative network of Ri.Nova, advisors, farmers, and producers' organisations.

RINOVA agricoltura ambiente alimentazione
Con il contributo di: HERAmbiente

Incontro tecnico

Venerdì 6 marzo 2026
ore 10:30 – 16:30

presso:
Sala Violante Malatesta – Cesena Fiera
Via Dismano, 3845 – Pievesestina di Cesena (FC)
È possibile seguire l'evento anche online, il link sarà inviato agli iscritti.

La qualità dei suoli: Il ruolo dei fertilizzanti a base organica, dalla teoria al campo

La qualità del suolo rappresenta un elemento chiave per la sostenibilità dei sistemi agricoli e la tutela degli ecosistemi. Un suolo sano è in grado di svolgere funzioni fondamentali quali il sostegno alla crescita delle piante, la regolazione del ciclo dell'acqua e dei nutrienti e il mantenimento della biodiversità, fornendo servizi ecosistemici essenziali per l'ambiente e la società.

Negli ultimi decenni, tuttavia, la qualità del suolo è stata progressivamente compromessa da diversi fattori di degrado, spesso legati a pratiche di gestione intensive e agli effetti del cambiamento climatico. In questo contesto, la sostanza organica del suolo assume un ruolo centrale nel contrastare tali processi e nel migliorare la fertilità e la resilienza dei suoli.

I fertilizzanti a base organica rappresentano uno strumento strategico per l'incremento e il mantenimento della sostanza organica, contribuendo al miglioramento delle proprietà fisiche, chimiche e biologiche del suolo. La loro corretta gestione può favorire una produzione agricola più sostenibile e duratura nel tempo.

L'incontro tecnico si propone di approfondire il ruolo dei fertilizzanti a base organica nel miglioramento della qualità del suolo, mettendo in relazione le loro caratteristiche con le funzioni e i servizi ecosistemici del suolo. Attraverso contributi scientifici e la presentazione di casi studio di lunga durata e casi applicativi su diverse tipologie di colture, la giornata intende offrire un momento di confronto e aggiornamento tecnico-scientifico rivolto a tecnici, operatori del settore, ricercatori e decisori pubblici.

Per partecipare è necessario iscriversi entro il 20/02/2026 al link https://forms.gle/RTEaDK3FCMqML2S7.
Il link per partecipare online all'evento sarà inviato ai soli iscritti.

Il progetto CARBON FARMING CE è finanziato dal Programma Interreg Central Europe 2021-2027, convenzione n° CE0100255"
Il progetto SPIN-FERT è finanziato dal Programma Horizon Europe

Informazioni e Segreteria: Ri.Nova soc. coop. Cesena (tel. 0547/313541) www.rinova.eu

RINOVA agricoltura ambiente alimentazione
Con il contributo di: HERAmbiente

Programma interventi:

10:00 – 10:30 Accoglienza – Caffè di benvenuto
10:30 Saluti introduttivi e presentazione della giornata
Maria Grazia Tommasini, *Ri.nova* e **Claudio Marzadori**, *UNIBO*
10:40 Ruolo chiave del carbonio organico e sua circolarità
Claudio Ciavatta, *UNIBO*
11:00 Aspetti produttivi e qualitativi ammendanti organici
Pier Paolo Piccari Ricci, *esperto di Valorizzazione Materiali Biodegradabili*
11:20 Metodologie di misura e significato degli indici di qualità
Luciano Cavani, *UNIBO*
11:40 È possibile considerare tutte le componenti della fertilità in un indice di qualità del suolo? L'approccio di SPIN-FERT
Eligio Malusà, *CREA, In Hort*; **Maria Grazia Tommasini**, *Ri.nova*
12:00 Utilizzo di fertilizzanti a base organica in vigneto - effetti sulla qualità del suolo
Martina Mazzon, *UNIBO*
12:30 Herambiente, a tutela dei suoli
Valentina Passabì, *HERAmbiente*
Modera: Claudio Marzadori, UNIBO
13:00 – 14:00 Pranzo a buffet
14:10 Compost da FORSU in orticoltura: dosi di impiego, riduzione dei fertilizzanti minerali, effetti sulla qualità del suolo e possibili rischi
Luigi Morra, *CREA*
14:30 Impiego di fertilizzanti organici da materiali di riciclo in colture cerealicole
Marco Grigatti, *UNIBO*
14:50 Esperienza dimostrativa sull'uso di compost nel Progetto Carbon Farming
Sara Turci, *Ri.nova*
15:10 Salute del suolo: politiche europee e azioni regionali
Giampaolo Sarno, *Regione Emilia-Romagna*
Modera: Maria Grazia Tommasini, Ri.nova
15:30 – 16:30 Domande e conclusioni

Moderatori: Maria Grazia Tommasini, Ri.nova e Claudio Marzadori, UNIBO

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Figure 19: Flyer of the event "Soil quality: the role of organic fertilizers, from theory to field application", 6th of March in Cesena in national language. A Teams Link was also available for online participation. The first page presents the general description.

Experiences and lessons learnt, participant's feedback

During the upscaling phase, several important experiences and lessons were gained regarding both the business model and the implementation of carbon farming practices. Collaboration between Rinova, advisors, farmers, and producers' organisations proved highly effective. The process highlighted the strengths of the business model, particularly the consistent support provided by advisors through the producers' organisation, which ensured continuity in guidance and practical assistance. Farmers were able to implement compost and soil amendment practices with confidence, reporting both perceived benefits, such as improved soil management and easier integration into existing operations, and practical challenges, mainly related to the availability and quality of organic materials (this proved to be a crucial aspect that may limit the wider adoption of this practice), additional costs, and timing of application. Compared to cover crops tested in the previous phase, compost and soil amendment practices were perceived as easier to integrate into intensive horticultural systems, despite these constraints.

Figure 20: On-field support during the application of soil amendments, including the organisation of plots to test and compare different amendment sources.

A key lesson was the crucial role of Ri.Nova as a bridging actor. By facilitating dialogue among farmers, advisors, researchers, and policy makers, Ri.Nova helped translate scientific and policy related information into practical insights for on-farm implementation, while conveying operational constraints and needs from the field to research and policy actors. Among the positive outcomes, the phase reinforced motivation and awareness among farmers regarding the environmental benefits of carbon farming practices and strengthened engagement with the broader stakeholder network. The sessions with research institutions allowed farmers and advisors to deal with evidence-based results, while interactions with policy makers helped raise awareness of regulatory and institutional barriers to wider adoption. These experiences confirmed that structured, multi-actor cooperation enhances both technical robustness and policy relevance of carbon farming initiatives.

The practice was generally perceived as positive by farmers, particularly due to the benefits observed in terms of improved soil quality and soil management. However, uncertainties remain about its valorisation through carbon credits, particularly regarding the baseline definition. It is still unclear whether farmers who have already applied these practices for several years will have their previous

efforts recognised and rewarded, which remains an open issue for future scaling. Overall, the upscaling phase confirmed the effectiveness of the business model and the added value of Ri.Nova's coordination, while highlighting the need for continued advisory support and clear carbon credit frameworks.

Feedback from farmers and advisors involved in the upscaling phase was overall positive. Farmers valued the continuous support provided through the producers' organisation and Ri.Nova, which helped clarify implementation steps and reduce uncertainty related to carbon farming practices. Participants reported increased awareness of the environmental benefits of compost and soil amendment practices, particularly regarding soil quality and long-term sustainability. Advisors confirmed the effectiveness of the cooperation model and appreciated the facilitated interactions with research institutions and policy makers, which improved mutual understanding and helped communicate farmers' needs beyond the farm level.

Figure 21: Meeting between advisor and policy makers to discuss emerging carbon farming policies and results of implemented practices (November 2025).

The business model's future viability and sustainability

The outlook for the cooperation model is mainly positive, as the upscaling phase confirmed its robustness and adaptability across different production systems. The model is designed to be expanded through replication rather than structural change, allowing adaptation to local contexts using existing organisational frameworks and cooperation systems. Further development will rely on maintaining Ri.Nova's role as a coordinating and bridging actor, ensuring continuity in the dialogue among farmers, advisors, producers' organisations, research institutions, and policy makers.

Producers' organisations will continue to represent key entry points for engaging farmers, providing stable advisory services and facilitating the integration of carbon farming practices within existing value chains. Future expansion may benefit from prioritising carbon farming practices that are easier to manage at farm level, while addressing economic and logistical barriers through advisory support and policy incentives. A critical element for future expansion is the continuous training of both

advisors and farmers. Strengthening advisors' technical capacity on carbon farming practices, monitoring approaches, and policy frameworks will be essential to support a growing number of farms and to address the limitations identified during upscaling. Despite the effectiveness of the cooperation model, a major barrier to its replication remains the uncertainty related to carbon credit generation and valorisation. The procedures to obtain, certify, and monetise carbon credits are still unclear, and it is uncertain whether farmers will be adequately rewarded. As a result, this condition reduces incentives and limits large-scale business model adoption, despite its effectiveness. Overall, the model provides a solid framework for scaling carbon farming practices in a structured, policy-relevant, and territorially grounded manner. Thus, continued dissemination and training activities are planned to support the long-term uptake and replication of carbon farming practices.

POLAND

Model type: within agri-food chain

From testing to upscaling: the evolution of the tested model

During the testing phase, the business model functioned mainly as a CAP-anchored cooperation set-up: a farmer (often in a demo role) implemented selected practices supported by the CAP (notably reduced/ simplified tillage, agroforestry-related systems, natural or organic fertilizers), while partners focused on validating roles, procedures, and feasibility through implementation tracking and qualitative monitoring. The core emphasis was on proving that the cooperation works and that CAP-supported practices can be organised into a workable model supported by the research-based developed tools.

In the upscaling phase (10 months of mentoring), the model evolved operationally and structurally to accommodate new entrants and real on-farm investment decisions. IUNG-PIB continued the CAP-supported practice package (reduced tillage and maintaining/developing agroforestry/silvopastoral solutions), but expanded it with hands-on implementation support (equipment selection for no-till/reduced tillage, practical design of agroforestry/silvopasture including species selection recommendations) and with consideration of market-facing elements that were not central in testing (carbon certificates, insetting options, links to value-chain actors). IUNG-PIB also strengthened the evidence base by adding soil sampling and analysis, which shifted the process from primarily action-based monitoring to a more diagnostic, data-supported mentoring approach.

These changes were necessary because upscaling required a model that could deliver repeatable, measurable results and support different types of participants. As a result, the structure of cooperation changed: new roles emerged (economic environment actors such as technology providers, potential insetting partners/buyers, certification-related stakeholders), and the project partner role moved from "model validation" toward implementation mentoring and technical/analytical support, while the farmer's role expanded from adopter to co-designer and case provider. Overall, the model shifted from a relatively closed, CAP-compliance-oriented pilot

supported by research based developed tools to a more open, multi-actor cooperation with stronger operational guidance and clearer links to economic viability and long-term scalability.

Figure 22: Soil – Carbon - Value event participants in Puławy, Poland.

Activities during the upscaling phase

For the upscaling phase, IUNG-PIB launched an open call at the end of June 2025 via social media channels, inviting farmers to apply for 10 months of mentoring within the Carbon Farming CE business model framework. One application was received, from a highly suitable candidate farm (Ciasnocha Family Farm), so IUNG-PIB did not continue recruitment. The selected farm is a strong "model case" because it combines permanent grasslands (high-quality hay production) with arable land under simplified/reduced tillage, and it also operates a silvopastoral / agroforestry component. Importantly, the farm already cooperates with multiple companies (advisory centres, administration, research centres also) and is actively building relationships with actors engaged in insetting, climate adaptation solutions, and emerging carbon certificate approaches. Given this readiness and connectivity, the farm could meaningfully test the cooperation logic beyond the pilot setting. Compared to the testing phase, the model in upscaling became more multi-actor and market-facing: the farmer's role expanded from implementing practices to co-developing cooperation pathways with private-sector stakeholders (technology, value-chain partners, potential insetting counterparts), while the project partner role shifted from "testing" to hands-on mentoring and facilitation, supporting concrete implementation decisions and strengthening links to real-world business relationships.

During the support/upscaling phase, IUNG-PIB provided a structured mix of on-farm mentoring, technical diagnostics, peer learning, and stakeholder-facing dissemination, tailored to the needs of a new entrant that was already active in reduced tillage and silvopastoral/agroforestry solutions and wanted to strengthen both performance and cooperation pathways.

Figure 23: Ciasnocha Family farming practices.

Activities carried out and why they mattered:

- **On-farm visit and discussion of previously collected soil samples**: This visit was essential to translate laboratory results into practical decisions on nutrient management and soil-improving measures, and to create solid documentation of baseline conditions and implemented practices.
- **Online mentoring meetings** (regular check-ins on cooperation, interim results, and recommendations): These meetings ensured continuity of support, helped troubleshoot implementation barriers in real time, and allowed the farm and partners to align actions with the business model logic (roles, responsibilities, and next steps).
- **Study visit** to the IUNG-PIB Agricultural Experimental Farm, enabling the farmer to see and discuss silvopastoral/agroforestry systems and reduced tillage experiences in practice—supporting learning-by-seeing and accelerating implementation confidence.
- **In-depth assessment** of the farm's potential and development pathways for the applied practices: We reviewed how the current practice package affects crop production and farm resources, analysed soil and nutrient results, and formulated clear recommendations on what to maintain, what to improve, and what to introduce next. This was crucial for turning "good practices" into a coherent, scalable improvement plan.
- **Dedicated in-person session** (side meeting) during the Agroekoton Association conference in Pulawy (11 December 2025) to present near-final findings and recommendations: This milestone was important to validate conclusions with the farmer, communicate them in a professional setting, and open the discussion to broader audiences relevant for further replication and cooperation.
- **A two-day stakeholder event** (29–30 March 2026), with engagement of advisors, private companies, administration, and NGOs. This activity is key for scaling because it strengthens the value proposition, builds trust among actors, and creates a platform to recruit and mobilise additional stakeholders.

- **Farm participation in additional professional events** and peer learning opportunities, including the IUNG-PIB conference on 31 March 2026 focused on new business models in the bioeconomy (to connect the farm with wider innovation and market discussions).

Figure 24: Visits in the IUNG agricultural experimental farm.

Experiences and lessons learnt, participant's feedback

During the upscaling phase, the overall experience confirmed that the cooperation/business model can work well in practice, but that successful upscaling is driven more by "readiness and capacity" than by the existence of a protocol alone. Working with one highly engaged farm allowed us to scale the model in depth and generate strong, credible insights — yet it also revealed the practical limits of scaling when resources are constrained.

The selected farm had a strong baseline (grasslands, arable land under simplified tillage, and a silvopastoral/agroforestry component) and — crucially — was already embedded in cooperation with private companies and emerging climate/insetting initiatives. This meant that mentoring could move quickly from general concepts to concrete decisions (practice optimisation, investment choices, cooperation pathways). The combination of on-farm work, online check-ins, and milestone presentations created a rhythm that supported continuous improvement and kept momentum high.

The main limitation was scale: IUNG-PIB intentionally prioritised depth over breadth and did not have the capacity to support multiple new entrants. While this improved quality, it reduced the diversity of cases and limited statistical comparability. Another challenge was managing expectations around carbon certificates and market instruments —interest was high, but the landscape is complex, evolving, and not always immediately actionable at farm level. Data needs (diagnostics, documentation, coordination) also require time and discipline from both the farmer and partners.

The farmer's motivations — improving resilience, optimising production resources, strengthening cooperation, and exploring value-chain opportunities — largely translated into tangible benefits: clearer practice priorities, stronger decision support, and greater visibility through professional events. A new benefit emerged as well: the model acted as a network catalyst, helping mobilise advisors, companies, NGOs and administration around a shared value proposition. At the same time, new challenges became more visible: ensuring continuity of support beyond project timelines, and balancing CAP-compatible practices with emerging market-driven requirements.

Many peer review messages from the testing phase were validated in practice: upscaling works best when roles are clear, mentoring is hands-on, and the model is supported by credible evidence and professional facilitation. The upscaling phase showed that the methodology is robust, but real-world implementation depends on capacity, trust-building, and practical decision support — not only on the formal structure of the business model.

Figure 25: Podcast recording on carbon farming with the farmer.

The participant underlined that regeneration and cooperation models need continuity beyond project timelines; a "light but stable" follow-up framework would help maintain momentum. The farm also valued the upscaling phase as "practical, partner-like mentoring" rather than a typical project exercise. They emphasised that the support helped them connect day-to-day agronomy with a wider climate and business narrative, and turn ongoing regenerative efforts into a clearer, documented pathway for further cooperation and scaling.

> *"Regeneration (also carbon farming) is a system. The mentoring helped us connect grasslands, arable choices and agroforestry into one roadmap."*
>
> *"The biggest value is bridge-building: farmers at the centre, but with advisors, companies and policy tables actually linked."*
>
> *"If we want real scale, we must scale trust and implementation capacity—not just participation numbers."*

The business model's future viability and sustainability

The outlook after the upscaling phase is to move from a “supported/testing pilot” to a repeatable cooperation framework that can be maintained beyond the project and gradually expanded. In the short term, IUNG-PIB will consolidate the farm’s results into a clear value proposition (practice package + decision support + cooperation pathways) and use the planned stakeholder events to translate mentoring outcomes into broader uptake.

For further development of the cooperation model, the priority is to strengthen its “operational backbone”: (1) a standard onboarding and mentoring pathway for new entrants, (2) a practical monitoring and documentation set aligned with both CAP-supported practices and market-facing needs, (3) support from research Partners with tools developed and (4) a stable multi-actor network around the farm (technology providers, advisory services, potential insetting/value-chain partners). IUNG-PIB will also continue peer-learning through study visits and thematic exchanges (e.g. reduced tillage, silvopastoral/agroforestry design, nutrient and soil diagnostics), ensuring that knowledge stays practical and implementation-oriented.

Regarding sustainability, the model can remain viable if it is embedded in existing structures (advisory systems, demonstration networks, producer organisations and regional initiatives) and if partners commit to a light but continuous facilitation role. Expansion should follow a “quality-first” approach: selecting a small number of farms with high readiness, building strong cases, and then scaling through replication, events, and network mobilisation — rather than attempting broad recruitment without sufficient mentoring capacity.

Figure 26: Visit of IUNG experts in the Ciasnocha Family Farm.

SLOVAKIA

Model-type: outside agri-food chain

From testing to upscaling: the evolution of the tested model

The business model tested in Slovakia – the Carbon Farmer Label – was originally developed during the testing phase as a cooperation framework connecting regenerative farmers, food processors and project partners. The model aimed to promote climate-friendly agricultural practices and provide a recognizable label for products produced using carbon farming techniques. During the upscaling phase, the model was further refined in order to address several challenges identified during the testing period. These challenges included limited institutional support, insufficient consumer awareness, and uncertainty regarding financial incentives for farmers implementing regenerative practices.

The structure of cooperation remained largely unchanged, but the roles of stakeholders became clearer and more defined. Farmers continue to be the main actors implementing carbon farming techniques such as cover crops, intercropping, and soil organic matter enhancement. At the same time, additional emphasis was placed on advisory support, communication activities, and engagement with food companies interested in sustainable value chains. The upscaling phase therefore focused on strengthening cooperation between stakeholders, increasing visibility of the model and preparing the ground for wider adoption of the Carbon Farmer Label in Slovakia.

The model primarily focuses on:

- regenerative farmers implementing carbon farming practices,
- food companies interested in sustainable sourcing and carbon-neutral value chains,
- advisory organizations supporting the transition to regenerative agriculture,
- the wider public and consumers interested in environmentally responsible food production.

Activities during the upscaling phase

New participants were recruited through several project activities and communication channels. The Carbon Farming CE project team presented the business model and its objectives at seminars, workshops and networking events organized within the project. Compared to the testing phase, the upscaling phase placed greater emphasis on building a broader network of labelled farmers and strengthening cooperation across the food value chain.

During the upscaling phase, several activities were implemented to support the development and promotion of the Carbon Farmer Label business model in Slovakia. A series of seminars and workshops were organized to present carbon farming principles and the Carbon Farmer Label concept to farmers and agricultural stakeholders. These events provided information on regenerative agricultural practices, soil carbon sequestration techniques and potential economic benefits

associated with carbon farming. The seminars also served as networking platforms where farmers, researchers and advisors could exchange experiences and discuss opportunities for collaboration. The project team also actively engaged with farmers and other stakeholders interested in regenerative agriculture. Meetings and discussions with farmers and representatives of the agri-food sector helped to better understand practical challenges associated with implementing carbon farming techniques and integrating them into existing farming systems.

Advisory support was provided to farmers interested in implementing regenerative practices. This included information on carbon farming techniques, soil management methods and opportunities for integrating carbon farming into existing agricultural production systems. Supporting materials from previous project activities were also shared with interested stakeholders, including training materials and presentations related to carbon farming methods.

Promotion of the Carbon Farmer Label and regenerative agriculture was carried out through presentations, seminars and communication materials prepared within the Carbon Farming CE project. These activities aimed to increase awareness among farmers, food companies and consumers about the environmental and economic benefits of carbon farming and to encourage participation in the business model.

Figure 27: Promotion of the Carbon Farmer Label in Slovakia.

Experiences and lessons learnt, participant's feedback

The upscaling phase in Slovakia provided valuable insights into the opportunities and challenges related to implementing carbon farming business models. One of the main positive outcomes was the growing interest among farmers and agricultural stakeholders in regenerative agriculture practices. Educational events and seminars proved to be an effective way to introduce carbon farming concepts

and encourage discussion about their practical implementation. However, several challenges were also identified. Farmers often expressed concerns about the financial risks associated with transitioning to regenerative practices and the lack of clear economic incentives. Limited consumer awareness of carbon farming and sustainable agricultural production also represents a barrier to the market development of labelled products. Another important lesson learned was the importance of building strong partnerships across the value chain. Cooperation between farmers, advisors, food companies and consumers is essential for the successful development of carbon farming business models. Overall, the experience gained during the upscaling phase confirmed that carbon farming initiatives require not only technical solutions but also strong communication, advisory support and policy alignment.

Figure 28: Promotion of the Carbon Farmer with a labelled product.

Feedback from farmers and stakeholders participating in project activities has generally been positive. Many participants expressed interest in regenerative agricultural practices and acknowledged the environmental benefits of carbon farming. Overall, participants recognized the Carbon Farmer Label as an innovative concept with strong potential for further development, provided that adequate support mechanisms and market awareness are established.

The business model's future viability and sustainability

The future development of the Carbon Farmer Label model in Slovakia will focus on strengthening cooperation between farmers, food companies and advisory organizations. Further steps will include:

- expanding the network of farmers participating in the Carbon Farmer Label initiative,
- continuing educational activities and capacity building for farmers,
- strengthening communication and promotion of carbon-friendly agricultural products,
- exploring opportunities for integration with European carbon farming initiatives and certification frameworks.

The long-term sustainability of the model will depend on the development of supportive policy frameworks, including the EU Carbon Removal Certification Framework (CRCF) and future agricultural policy instruments. With continued cooperation between stakeholders and further development of advisory and communication activities, the Carbon Farmer Label model has strong potential to contribute to the wider adoption of carbon farming practices in Slovakia.

SLOVENIA

Model type: within agri-food chain

From testing to upscaling: the evolution of the tested model

The carbon-smart flour cooperation model in Slovenia was developed with a focus on the application of carbon farming practices in crop production and the placement of carbon-smart flour on the market. During the testing phase, the cooperation primarily involved farmers, the Agricultural Institute of Slovenia and retail channels, providing a basis for evaluating the feasibility of the model.

In the upscaling phase, the business model itself did not significantly change. Instead, the focus of the activity shifted towards extending the existing cooperation beyond the pilot phase and strengthening the downstream part of the agri-food chain. This transformation was necessary in order to assess the potential of the tested model for broader market-oriented implementation and value-added food processing.

As part of this evolution, new downstream roles were introduced, while the core structure of cooperation between farmers and KIS remained unchanged. The upscaling phase therefore built directly on the results of the testing phase and aimed to move the model closer to final consumers.

Activities during the upscaling phase

KIS published an open invitation for participation in the upscaling of the carbon farming business model. The invitation was disseminated through existing professional networks and internal communication channels. Although no formal applications were submitted through application forms, interest was collected through direct communication and discussions with potential stakeholders. Based on this process, a targeted approach to participant inclusion was applied.

An existing local bakery and food production social enterprise was internally selected as a downstream partner for the upscaling phase. The partner was considered suitable due to its focus on local food production, social entrepreneurship and its capacity to integrate carbon-smart flour into final consumer products. Compared to the testing phase, the cooperation was expanded by including this additional actor within the agri-food chain, enabling the use of carbon-smart flour in food processing and preparation.

Figure 29: Carbon-smart flour from the Agricultural Institute of Slovenia.

During the upscaling phase, several activities were carried out to support the expansion of the existing business model. These activities mainly focused on coordination, knowledge transfer and practical implementation.

The concept of carbon-smart flour and the background of carbon farming practices were presented internally to staff responsible for production and marketing, ensuring a common understanding of sustainability objectives and market positioning. In addition, practical discussions were held with the selected local bakery and food production social enterprise regarding the use of carbon-smart flour (Gorolka) in the preparation of final food products.

KIS provided advisory and coordination support related to sustainability principles, traceability of raw materials and communication of carbon farming practices. These activities were important to ensure that the core elements of the tested business model were preserved during the upscaling phase and that the downstream partner could integrate the flour into its production processes in a consistent and transparent way.

Experiences and lessons learnt, participant's feedback

One of the main experiences during the upscaling phase was that formal, application-based calls do not always lead to submitted applications, particularly in innovative or niche business models. In this case, direct communication and existing professional networks proved to be more effective in identifying suitable partners for cooperation.

The upscaling phase confirmed that cooperation within the agri-food chain represents a realistic pathway for scaling carbon farming business models. The involvement of a downstream food processing partner helped to better understand practical requirements, market expectations and communication challenges related to carbon-smart products.

At the same time, the experience highlighted the importance of clearly communicating the added value of carbon farming practices, both to cooperation partners and to consumers. Overall, the upscaling phase demonstrated that a flexible and targeted approach can successfully complement formal procedures in the implementation of upscaling activities.

Initial feedback from the involved local bakery and food production social enterprise has been positive, particularly regarding the quality and sustainability profile of the carbon-smart flour. Interest was expressed in continued cooperation and further development of products based on carbon-smart raw materials, while emphasizing the importance of consumer acceptance and clear sustainability communication.

The business model's future viability and sustainability

Future activities will focus on further strengthening cooperation within the agri-food chain and exploring opportunities for expanding the range and visibility of carbon-smart flour products. Feedback from the involved bakery and food production social enterprise will be used to further adjust cooperation arrangements and sustainability communication.

The inclusion of a local social enterprise engaged in food preparation provides a solid basis for further development of the model, as it demonstrates how carbon farming practices can be linked to value-added food production. The model shows potential for further expansion by involving additional processors or retail actors, contributing to its long-term sustainability and transferability.

Figure 30: Cookies from Carbon smart flour made by local bakery and food production social enterprise.

KEY LESSONS LEARNT DURING THE UPSCALING PHASE

The upscaling phase provided numerous lessons both at the level of cooperation models in general and in relation to the implementation and feasibility of specific models. The most important takeaways are:

- In real-life circumstances, models that are separate in theory often converge or transform into one another during later stages of implementation, depending on needs, opportunities, and circumstances. For example, the suitability of the chosen fields as well as legal questions of possible changes in land ownership can play a role in the viability of a business model.
- In a multitude of cases, it proves challenging to establish initial financial security. This phenomenon was evident in the tested model in Austria, and a similar observation was made in Croatia, where farmers opted to discontinue participation in certain eco-schemes due to the inadequacy of compensation to cover incurred additional costs (or risks). It is imperative that a suitable financing mix is identified, encompassing the incorporation of sponsorships and crowdfunding during the early model phase, with a view to enhancing stability and sustainability. A viable option could be the Austrian example, where after the physical implementation and first scientific data collection the financial funding mechanism shifts from private sponsoring to a “blended finance mix”, including private and public funds until CO2-certificates for the voluntary carbon market (VCM) can be generated. Although changes in environmental conditions and climate are themselves having an increasing impact on management decisions, farmers are essentially looking for guaranteed forms of return and reimbursement where they can be reasonably sure of receiving financial compensation for their efforts.
- It became evident in numerous instances during the process of upscaling that the role of knowledge transfer is of paramount importance, as is that of agricultural advisors. Moreover, the perpetual interaction with a diverse array of stakeholders, encompassing farmers, corporate entities and research organisations, was given pronounced emphasis.
- In models where carbon credits are taken into consideration., the claim of certification suitability can be highly challenging in early project phases, as all criteria for (later) certification must be taken into account from the very beginning of a cooperation model. The certification criteria "additionality" (or baseline definition) can present a substantial challenge. Stakeholders must demonstrate that CO2 removal would not have been achieved without the (early stages of the) business model. Accurate and professional documentation is a key responsibility for business and scientific stakeholders in a cooperative arrangement, as it goes beyond the farmer's usual duties and expertise.

- Government-led models, eco scheme and environmental measures/regenerative agriculture schemes financed by EU CAP support are currently the most widespread business models known and used by farmers nowadays. In many cases, they do not explicitly utilise "carbon farming"-targeted schemes (and these vary from country to country), have the capacity to evolve into a more complex and “integrated framework”. This integrated framework is capable of simultaneously ensuring financial sustainability and encouraging farmers to direct their production towards more sustainable agriculture, but this can be achieved only through the combination of various subsidies, schemes and programmes and with significant advisory support at the farmer level. In other words, the support scheme system can be overly complex and insufficiently clear for end users, with a considerable number of administrative requirements, that do not reflect the real-life circumstances of farmers. For most farmers, adopting these practices is closely linked to the advisory process, since advisors carry out the CAP's administrative procedures.
- The advisory service-driven model, elaborated in the testing report received extensive validation during the upscaling process. The concept sits somewhere in between the “Outside of agri-food chain” and “Knowledge transfer/project” type. However, unlike the better-known voluntary carbon market projects, where the benefits for farmers focus primarily on the financial income from the sale of carbon credits and the solid promise of such revenue, the advisory-driven model does not primarily target this, but is rather based on regular agrotechnical, farm management, and administrative (monitoring) assistance provided as part of the advisory service routine, which advisors already carry out as a dominant part of their everyday work.
- Sharing knowledge has become a key part of most models, not just the project-led/knowledge transfer-oriented ones. The way this is done can be different (as we can see from the German, Polish and Czech examples), but the most important thing is that they try to include as many stakeholders as possible. It has also been proven that reconfiguring and expanding existing structures, networks, and connections can result in much more sustainable cooperation.
- The upscaling phase also highlighted the importance of clearly communicating the added value of carbon farming practices, both to cooperation partners and to consumers.
- Producers’ organisations can serve as key entry points for engaging farmers, providing stable advisory services and facilitating the integration of carbon farming practices within existing value chains. Future expansion may benefit from prioritising carbon farming practices that are easier to manage at farm level, while addressing economic and logistical barriers through advisory support and policy incentives.
- In Slovenia, the upscaling phase confirmed that cooperation within the agri-food chain represents a realistic pathway for scaling carbon farming business models. The involvement of a downstream food processing partner helped to better understand practical requirements, market expectations and communication challenges related to carbon-smart products.

- Models involving carbon credits may encounter numerous difficulties and resistance in the initial stages. Managing expectations around carbon certificates and market instruments can be a challenge, as the landscape is complex, evolving, and not always immediately actionable at farm level. Data needs (diagnostics, documentation, coordination) also require time and discipline from both the farmer and partners. In many cases, issues of trust and reputation also arise. For example, in Hungary a notorious carbon management project gave carbon credits an extremely bad image, the effects of which can still be felt today and project partners have also encountered mistrust in several other countries.
- Building on the previous point, farmers often expressed concerns about the financial risks of transitioning to regenerative/carbon practices, as well as the lack of clear economic incentives. The long-term sustainability of the model will depend on the development of supportive policy frameworks, especially the EU Carbon Removal Certification Framework (CRCF). At the inception of the project, it was anticipated that this framework would be in place during the testing-upscaling phases. However, the precise terms and conditions (e.g., monitoring, verification, and reporting aspects) are still in the process of development. These will be essential not only for models based on carbon credits, but also for virtually all other types of cooperation models that interact with them.