EU CAP Network Focus Group

'Regenerative agriculture for soil health'

Mini Paper 2

Reaching hearts and minds: how education reform and more effective dissemination of knowledge can support the mainstreaming of regenerative agriculture in Europe

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Introduction

Increasing number of farmers have improved the sustainability of their production systems by implementing certain practices of regenerative agriculture, but this is often a long-term process and the majority of farmers are, at best, still at the initial stages.

Besides agronomic or economic difficulties, changing the farming system is often a matter of changing the "culture", the paradigm. In many cases, regenerative farming has been developed by pioneer farmers, aligned with their local context, with their own resources and taking their own risks, instead of following a top-down approach. Peer to peer access to information on regenerative agriculture is often easier than before, especially with social networks, therefore a flow of new ideas is continuously tested by farmers, who need to cope with an ever-changing context (economic, regulatory, climate etc.), as well. However, knowledge is still mostly scattered and not yet well structured. Accessing reliable and clear information is difficult not only for farmers but also for advisors.

Regenerative agriculture is an outcome- and principle-based approach to agriculture that focuses on restoring and enhancing soil health. In addition to restoring soil health, regenerative agriculture also aims to reverse biodiversity loss, restore well-functioning water cycles, adapt to and mitigate climate change and increase economic profitability. The practices that regenerative agriculture promotes to implement should be adapted to the local context.

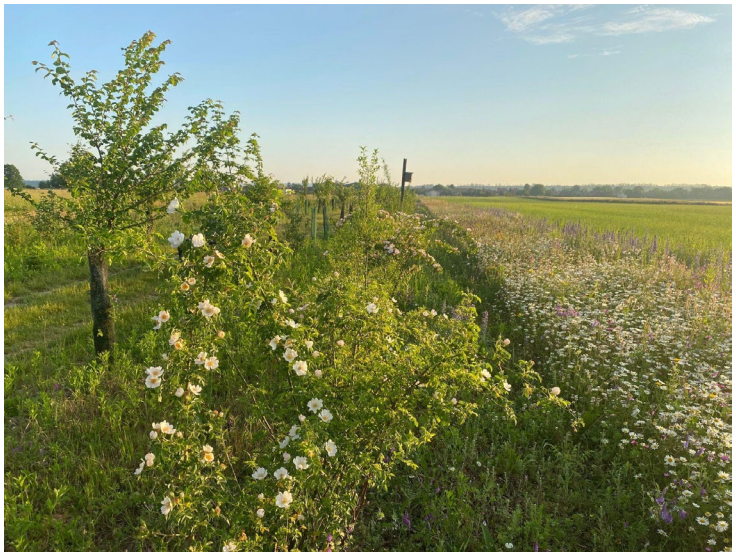

Image 1. Grand Farm in Austria. Grand Farm (2021)
Source : Alfred Grand

Beyond a change of mindset, introducing new practices on a farm also requires acquiring the relevant know-how. This should be provided not only by progressive farmers, but also by the AKIS (Agricultural Knowledge and Innovation System) that each EU Member State has set up.

Sharing up-to-date knowledge, practical solutions and guidance on regenerative agriculture with farmers through effective platforms, a reformed educational system and credible advisors could contribute to a long-term change in beliefs, attitudes and ultimately, in behaviour. The wider adoption of a holistic regenerative approach, as well as single regenerative practices among farmers could not only increase their and their farms' resilience but it could also help address the pressing issues of our time, such as climate change, biodiversity loss and food security.

Objectives

This mini paper aims to increase public awareness and understanding of the importance and key issues of mainstreaming regenerative agriculture, to inform readers - farmers, advisors, consumers, policymakers - about potential ways and existing best practices to address these issues and to explore how regenerative agriculture and regenerative practices could become more visible and how they could gain increased support from both farmers and the wider society.

Changing a whole system needs not only a new mindset but a change of heart, as well, both from the farmer and the surrounding community. This mini paper aims to provide thoughts, ideas and inspiration on how to create a more resilient and regenerative way of farming. All over Europe, this should be achieved through a reformed, up-to-date education based on the highest scientific standards and a more effective dissemination of knowledge for today`s farmers, as well as for the generations to come.

Context and key issues

Currently, the institutional education of future farmers is often based on material that excludes or insufficiently integrates the principles and practical examples of regenerative agriculture. At the same time, the national farm advisory systems are not based on up-to-date systematic knowledge either when it comes to regenerative agriculture, often because there is not enough science-based knowledge available to advisors. Motivating farmers to undertake more initiatives, fostering not only their own improvement but also the enhancement of other critical factors, especially environmental and economical ones, often prove to be challenging. During the 'information gathering' phase, farmers actively seek evidence to support their decisions, evaluate advantages and disadvantages, identify potential drawbacks and risks, and ultimately decide whether to implement these decisions in their specific circumstances or not.

Many farmers are willing to follow regenerative practices, but since knowledgeable and accessible scientists and advisors are often missing, farmers are forced to become researchers themselves. This takes a lot of resources: finances, labour and time. On the other hand, lack of sufficient awareness of the benefits and potential impact of regenerative agriculture can also result in farmers' perceived lack of need for knowledge on it and therefore, their lack of willingness to pay for it. Already at the level of education, this may create a barrier to the implementation of regenerative agriculture based on, to a large extent, false paradigms regarding, for example, humus and the stability of organic matter in the soil, the role of delivered dead biomass versus the role of exudates from living plants, or the role of soil microorganisms primarily as decomposers of organic matter.

The relationships between the elements of a socio-technical system, like values, knowledge, organisations, and technologies, can create strong interdependencies and self-reinforcing mechanisms, which can result in a lock-in, and may discourage stakeholders from adopting alternative production systems and practices. There should be more initiatives and projects focused on knowledge and practice transfer among regenerative farmers. At present, there is a noticeable lack of investment in knowledge transfer implementation, such as research and demonstration farms, pilot projects (lighthouse farms), and similar practical solutions. This is particularly pronounced in less developed countries. In the EU, between 2019 and 2021 only 6.1% of the total financial support allocated to the agricultural sector was dedicated to agricultural knowledge and innovation (OECD, 2023).

According to Eurostat, the number of young farmers below the age of 35 is only 6.5%, compared to 57.8% who are older than 55. This can have serious implications to the mainstreaming of regenerative practices. It reinforces the need to go beyond reforming the educational programme and teaching material merely in schools and at universities and focus on and also invest in reforming adult learning and advisory services on regenerative practices for a greater and faster impact.

In relation to the wider society, there is often widespread confusion about the difference between concepts like organic farming, regenerative farming, integrated management and agroecology. Educating consumers about the benefits and environmental impact of non-conventional farming practices could eventually affect their expectations, judgement, consumer demand and willingness to pay for products coming from regenerative farming.

State-of-the-art of research and practice

Educational programmes

In France, elements of regenerative farming have been taught in agricultural Vocational Education and Training (VET) schools since 2014 by including them in the agroecology framework. The national plan *"Enseigner à produire autrement"* (teach to produce differently) led to the renewal of many curricula. In this framework, the next generations of farmers and advisors are trained to better take into account the environmental impact of farming and to use the ecosystem services approach for a "greener" production. Students are taught to focus on farming systems as a set of practices that needs to be adapted to different objectives and contexts taking into account ecosystems and climatic risks. The general idea is not acting on the environment but interacting with it. Thus, students have to learn technical knowledge but also show that they are capable of adapting to the environment and to evolve with it.

Image 2. Enseigner à produire autrement, L'Institut Agro Montpellier (2023)
Source : L'Institut Agro Montpellier.

There is still great confusion regarding terms and definitions, for example, about what the difference is between agroecology and regenerative agriculture. While agroecology builds on ancestral practices and studies whole ecosystems - that is, the social, cultural, economic, and political dimensions as well in addition to their biology and ecology -, regenerative agriculture on the other hand focuses on restoring and enhancing soil health by rehabilitating organic matter and microbial activity in the soil.

Pilot farms and lighthouse farms

On-farm experimentation is considered to have a great potential, especially because of its systemic scale and adaptability to different contexts. This approach, that seems very appropriate to soil regenerative farming, is slowly spreading across the world, but it is still a minority compared to conventional, analytic experimentation (Lacoste et al. 2021). Based on co-learning, it is: (i) generally implemented at field scale, (ii) takes into account private interests of farmers and other stakeholders, (iii) creates value with interaction of different fields of expertise. These factors are very relevant to ensuring an effective dissemination of knowledge. Finally, giving the farmer a central role in the process, it can highlight the adaptation process to complex issues in a changing context.

In Estonia, there are a number of agroecological research projects on, for example, annual and long-term catch crops (Vaher, 2024; Ess and Vetemaa, 2022) and no-till farming (Lõhmuste, 2023) conducted at university level or by private companies in cooperation with farmers. In addition, a lot of research is done mainly by farmers themselves, including in cooperation with international actors and specialists.

In France the national action plan for pesticide use reduction has created and funded a national network of "reference farms" that aims at reducing pesticide use according to the specificity of the local context and production system. These farms commit to testing new practices, implementing them at the farm scale, and disseminate their experience. The involved farmers work with advisors that have the role of facilitators linking them to the rest of the national network and to research. One advisor manages around ten farms at local scale that share knowledge and define common actions (French Ministry of Agriculture, 2010).

The Lighthouse farms from the Global Network of Lighthouse Farms, initiated by Wageningen University. This is a network of 13 farms, which are pioneers in their specific production system, eager to accept students on the farm and closely working together with scientists to develop their production systems further. One of these farms is GRAND FARM, which is an Austrian regenerative, organic (ROC certified) arable field, agroforestry, grassland and vegetable farm. Alfred Grand (co-author of this mini paper) developed the farm into a research and demonstration farm for regenerative practices with a focus on Soil Health, Agroforestry and Market Gardening. GRAND FARM is participating in Horizon Europe, Erasmus+ and EIP-Agri focus groups, as well as EIP-Agri operational groups. Approximately 2000 visitors per year are welcomed, trained or demonstrated on the activity at the farm.

The incorporation of the EU Mission Soil`s bottom-up, multi-actor approach into Living Labs, that are being established under the EU Soil Mission, marks a significant development, promising to facilitate the adoption of regenerative practices. By directly involving a broad spectrum of stakeholders in both project design and implementation, this methodology ensures active engagement throughout the program.

One such example is a newly approved project on Carbon Farming by a consortium in Southern Europe. The project will develop five Living Labs (LLs), with partners that include researchers, end users (farmers) and policy actors. The core partners will identify complementary regional agricultural stakeholders to be directly involved in the definition of the LLs and their activities through a co-creation process, ensuring the adaptation to the regional needs and challenges faced by the primary sector. Each LL will also establish Lighthouse farms, where regenerative practices will be highlighted and demonstrated to regional farmers.

Farm advisory services and training tools

EU regulations mandate that all Member States establish a farm advisory system, aimed at assisting producers in aligning with the standards outlined in the Common Agricultural Policy (CAP). However, the effectiveness of Farm Advisory Services in the EU is constrained by the commercialisation of advisory services and the limited training of advisers, which poses further

challenges to promoting regenerative practices. Increasingly, advisory services in the EU are becoming privatised, with many advisory services offered by commercial agronomists tied to farm input sales (Sutherland and Labarthe, 2022). There are very few independent commercial advisers, partly because farmers have historically relied on free advice from input providers. Consequently, the transition to regenerative practices faces significant hurdles due to this reliance on commercially-driven advice.

In France since 2022, advice and pesticide sales have been officially separated in order to guarantee the independence of advice given to farmers and prevent conflict of interest that could result from the coexistence of these activities within the same organisation. Nevertheless, advising change of practices, such as adopting regenerative farming, is not straightforward. In many cases, advisors can choose the "safest" solution in order to protect crop yields and thus their relationship with the farmer. As they are often solicited to "do the right thing", they are not willing to take the burden of a risk. Risks should be assessed and shared with the farmer and advisors should help them minimise them, including helping them in on-farm tests.

A tool that is more and more used for system or practice change is serious games. Even though entertainment is a part of it, serious games serve other purposes, which the players may or may not be aware of. The design and use of serious games for farming has boomed in recent periods. Seen as tools for social innovation, they are used for teaching, scientific mediation and awareness-raising, as well as for action (decision support, foresight, design of new practices, simulations, etc.). Playing is part of the concept, as it allows us to escape from reality, thus allowing us to take risks that we would not take in reality and thus enabling creativity and openness. It is also a process of decisions made by the player or players together or against each other. These decisions are made according to the rules of the game, which can be challenged to a greater or lesser extent. This creates a balance in the uncertainty of the course of the game, but also of its outcome.

- Key to soil is a free serious game, available in French or English. It is a role-playing game developed by INRAE for use in introductory agronomic and environmental training courses at high school, bachelor's and master's levels. This game reproduces the barriers faced by the various actors involved in south-east France vegetable production as they make the transition to agroecological practices. It is based on the case of soil pest management. By simulating complex interactions between the actors in the agri-food system (R&D, advisory, production and marketing actors), it helps to understand the processes that prevent the development of agroecological practices for managing the health of soils in vegetable farms. The game facilitates the assimilation of generic knowledge on agroecological transition. It also encourages the exploration of multi-actor coupled innovations in response to the problems encountered during the game.
- Another example is Interplay, a board game also developed by INRAE, designed to support practitioners in assessing the ecosystem services provided by a large range of cereal-legume intercropping options. It was created during a ReMIX project and is now improved and further developed with the contribution of the IntercropVALUES project.
- Serious games can also be used for raising awareness targeting the general public. The Soil game is such an example.

In Greece, the EU-mandated Farm Advisory System has faced delays and was only recently initiated. Farm Advisory organisations must undergo state certification, in order to receive state support for delivering free advice to producers. An essential criterion for certification is the exclusion of any commercial activity in farm inputs, allowing certified advisors to focus on

improving farm profitability and reducing inputs. This restriction presents a great opportunity to facilitate the promotion of regenerative agriculture practices in other Member States, as well.

In Austria, some activities in research towards regenerative agriculture came up with implementing EIP-AGRI operational groups together with regenerative farmers (e.g. BIOBO, KLIWA, Agroforestry, Market Gardening, etc.). The NGO Verein Boden Leben initiated research together with BOKU University, accompanying farmers (Soil.Pioneers/Boden.Pioniere) in their on farm soil regenerative activities. At GRAND FARM, a private research and demonstration farm, co-creation of research questions from different stakeholders has led to research and demonstration activities on regenerative farming topics (soil health, biodiversity, agroforestry, market gardening, composting, vermicomposting, etc.). The research activities are conducted by national and international research institutions and projects.

Existing best practices

Regenerative agriculture has been integrated to varying degrees in European countries' educational curricula. It is increasingly the focus of research projects, courses, training, and thematic events. In countries, where institutionalised education is still lagging behind on teaching about regenerative practices, different bottom-up, independent, often farmer-led initiatives and platforms take up the mission of sharing knowledge and experience on regenerative farming.

The below table provides a collection of best practices and existing tools and platforms from selected European countries, demonstrating how regenerative agriculture is currently featured in national agricultural education and what other forms, networks, and initiatives exist for enabling knowledge-exchange and practical development on regenerative agriculture.

Country	Agricultural education	Knowledge-sharing
Austria	Bio Austria offers the Soil practitioners training which is a practice-oriented training aiming to give farmers a better understanding of the soil ecosystem and providing them concrete advice on soil management. In the training programme, soil practitioners act as multipliers by passing on their knowledge and experience on soils to their fellow farmers in lectures, working groups, field days, etc. Specific courses of the Rural Institute for Further Education (LFI) are provided with some level of focus on regenerative practices as part of AKIS. Some academic courses at the University of Natural Resources and Life Sciences (BOKU) in Vienna, as well as the curricula of some agricultural schools touch upon regenerative agriculture but they do not focus on it specifically.	There are multiple initiatives and groups working on sharing knowledge on regenerative agriculture in Austria, among them is 1. the Relawi student group at BOKU University, a think tank with the aim to connect interested students and other stakeholders and learn from each other about economically, ecologically and socially sustainable agro-ecosystems, which revive the desire to work and live in harmony with nature in the countryside; 2. the NGO Verein Bodenleben, an association with the goal to gather knowledge about soil-improving and erosion-reducing cultivation methods and to put this knowledge into practice through practice-oriented research work, awareness raising and knowledge transfer; 3. and several other smaller (farmer-led) organisations promoting carbon sequestration and soil health through demonstration and training, e.g. GRAND FARM.

Croatia	Regenerative agriculture is included in mandatory courses and modules at certain universities in Croatia. The main learning outcomes are focused on the application of environmentally friendly plant protection systems, determining the applicability of acquired knowledge, etc.	Generally, the majority of knowledge transfer among farmers occurs through their internal communication, methods like "train the trainer," and similar approaches. Additionally, advisors, both private and governmental, play a role in knowledge dissemination. In recent years, private advisors have regularly conducted workshops for farmers but primarily focused on EU funding opportunities. State advisors primarily transmit knowledge through organising mandatory education for farmers, such as eco-scheme programs. "Platforms" for knowledge transfer such as the National Rural Network have not emphasised regenerative agriculture and related examples of good practices in their previous work.
Estonia	The Centre of Estonian Rural Research and Knowledge (METK) long-term (since 2003) scientific agrotechnological (also crop rotation, green manure, catch/cover crops etc) research in METK field testing station, including observations regarding the effect to soil microorganisms, nutrient balance, the use of pesticides etc. Estonian University of Life Sciences have several research projects related to different regenerative practices (catch crops, cover crops, composting, no-till, use of digestive from biogas stations etc). Environmental and climate-change related courses are given by the Estonian University of Life Sciences, but a special course or curriculum for regenerative agriculture is missing.	Regenerative agriculture is currently a very hot topic for the last couple of years, both amongst younger farmers, but also scientists and policy-makers. Numerous different field-days, conferences and other initiatives have been organised by different stakeholders. For example, in 2021 a large conference was held at the Estonian Ministry of Regional Affairs and Agriculture. In 2023, eAgronom held a demo-day on catch crops: Vahekultuuride põllupäev 2023 ettekanded - YouTube In 2023, METK organised a Network to Innovate seminar on innovative solutions regarding regenerative agriculture. In 2024, The Northern Roots Forum organised by EST enthusiastic young farmers. It was an initiative with foreign experts and a lot of participants in Tallinn.
Finland	In Finland, a special e-course for regenerative farming is available in Finnish and Swedish language. In Finland a special course for advisors has been developed: "Mainstreaming regenerative agriculture by training agricultural advisors in soil health – experiences from Finland", developed by	In Finland, a regenerative farming criteria has been developed by the Baltic Sea Action Group.

	the Baltic Sea Action Group.	
France	In France, regenerative agriculture and agroecology have both been featured in the curricula of various educational institutions, programmes and projects, among them: 1. "*Enseigner à produire autrement*" and CEGA-TANGGO projects aiming at reinforcing links between VET schools and agroecology farmers groups; 2. GAMAE : a platform for choosing among many serious games available that can be used with students or farmers for farming practice changes; 3. the University of Pau offers an "agroecology, agroforestry and soil conservation" degree; 4. Institut Agro Montpellier offers a "biodiversity, soil, climate and environmental assessment" degree; and finally; 5. Agroparistech offers a degree in "Soil management and ecosystem services". Along with the renewal of agricultural VET schools' curricula in France, teachers need to create learning situations that allow the students to develop their toolbox and learn to cooperate in problem solving.	There are various groups, networks and platforms in France enabling the sharing of knowledge on regenerative agriculture, among them: 1. State-funded GIEE groups and network; 2. the BASE network and APAD network, two associations farmers pioneers of soil conservation farming; 3. the knowledge platform *"Ver de Terre Production"* especially videos on their YouTube channel; 4. "Triple performance" is an open-source website listing agro-ecological practices and feedback from farmers; 5. CAPISOL a webpage capitalising knowledge issued from agricultural Chambers on soil conservation farming.
Hungary	In the Hungarian agricultural university curriculum, "conservation agriculture" is still the dominant name used for teaching regenerative practices. Most elements of regenerative agriculture are being taught as part of the agricultural university programmes, with an increased focus on no-till farming and the use of cover crops. What seems to be missing is the integration of a more systemic and holistic approach and understanding of regenerative agriculture, incorporating all its principles. In January 2023, MATE, the Hungarian University of Agriculture and Life Sciences, organised a conference, Organic Producers' Second Winter Meeting, with the theme 'Regenerative farming in focus', discussing the main principles of regenerative agriculture, the importance of a landscape approach, and applying regenerative practices in market gardens and family farms.	Independent, bottom-up, farmer-led initiatives, like the Regenerative Farmers Association Hungary, play a significant role in sharing up-to-date, practical knowledge and experience with Hungarian farmers, as well as creating platforms and opportunities for knowledge exchange among conventional and regenerative farmers. The Association organises the annual Soil Life Conference, regular Farmers Forums focusing on a specific topic relevant to a specific region, farming method or soil type, and offers an online regenerative scoring system, allowing transitioning farmers to assess their own farms along specific regenerative principles. The Hungarian Research Institute of Organic Agriculture (ÖMKi) organises regular events focused on regenerative agriculture, including the EIT Food-financed regular trainings, leads regenerative farming-focused research and farm visits (e.g. to the

		Grand Farm in Austria).
Slovakia	While regenerative agriculture is not yet visibly integrated in the agricultural education curriculum of Slovakia, there are notable bottom-up, farmer-led initiatives actively advocating regenerative practices. The agricultural cooperative Krakovany-Stráže, based in Trnava region, regularly shares its experiences, celebrates soil health and promotes education about regenerative farming. They welcome school visits and organise information days. Among the vision and objectives of the cooperative we can furthermore find their commitment to give university students and professors a platform for research and to influence the country's agricultural university to allow the teaching of no-till practices and to change the content of its teaching programmes.	Agricultural cooperative Krakovany - Stráže, as a well-known lively example of regenerative agriculture, organises awareness raising events for citizens and the wider public. Since September 2020 the cooperative had over 2000 people participating in farm activities, from farmers, gardeners, to students and researchers, as well as policymakers. Once a week, on Wednesdays, the cooperative is open to anybody willing to better understand the work and practices adopted on the farm. Every September, an annual gathering called Living Soil Day is organised. This regular event engages more than 100 people who participate in the event activities. Other on-site events are also organised throughout the year. (For more information on the cooperative in English.)

Table 1. Existing tools and best practices for mainstreaming regenerative agriculture in selected European countries. Source : European Commission

The role of national CAP networks to promote regenerative agriculture

National CAP networks should play a more active role in the process of mainstreaming regenerative agriculture as they have the right contacts, and they serve as platforms to disseminate, share knowledge and information, but also facilitate networking. So far, national CAP networks have mainly supported rural communities/regional LEADER initiatives and groups in some countries. The new CAP has widened their network and added tasks (including environmental-friendly farming), which takes time to get familiar with and be effective (identify needs, find their specific role, reach out to stakeholders and develop networks).

The channels of dissemination must be tailored to farmers, which means it is necessary to explore the most effective ways through which news, knowledge, exemplary practices, or methods can reach them. Simply publishing on websites alone is not sufficient because farmers often do not even read those pages. Involving various media such as TV, radio, podcast-series specifically designed for farmers could yield greater success.

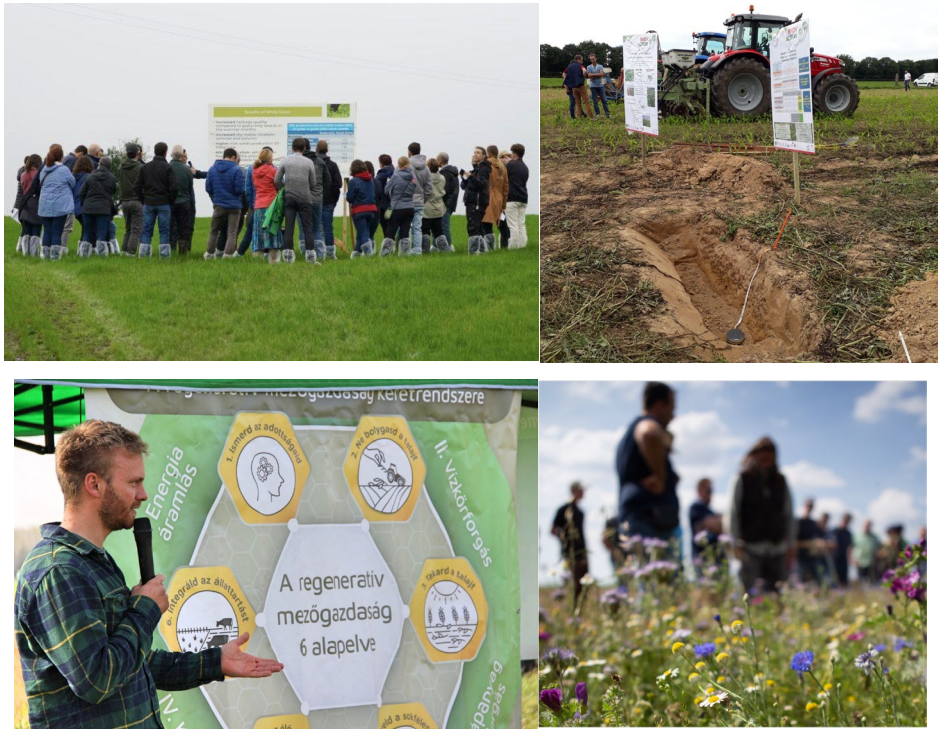

Image 3-6. Practical farm demonstrations, farmers` forum and knowledge-sharing examples on regenerative agriculture from Ireland, France, Hungary and Austria.
Source : (1) Thomas Alföldi, (2) Marie-Christine Fort (CRAN), (3) TMG Association, (4) Alfred Grand.

European and global initiatives promoting regenerative agriculture

Sharing knowledge and information about sustainable agricultural practices and approaches is supported by various European and global initiatives and fora. The EU CAP Network plays a crucial role in innovation and knowledge exchange and it also hosts the Focus Group "Regenerative agriculture for soil health" which enabled the publication of this mini paper. A new approach to the communication on regenerative agriculture is e.g. the Regenerative Organic Certificate. This is a global initiative, which has three pillars, Soil Health, Animal Welfare and Social Fairness for Farmers and Workers. The certificate builds up on organic standards and offers three different levels of certification, which are controlled by external audits from certified companies (similar to organic certification). Such certificates offer farmers the possibility not only to claim their regenerative work to their customers, but also to prove it. Even if this initiative is only starting in Europe, globally, already 2.4 million hectares of land are certified. It enables certified farmers to communicate more effectively about regenerative farming to the consumers.

Other best practice examples are:

- Various EU-wide projects:
  - 1. Climate Farm Demo. The project aims to increase, speed-up and disseminate the adoption of climate smart farming practices and tools in the EU. The project will set-up a network of pilot farms across Europe and associated countries to reach this goal.
  - 2. Climate Smart Advisors. The research approach is to strengthen the capacity of the advisory community in the EU, an EU-wide network of 260 advisory communities (CoPs) is being established. The CoPs will be supported with

training activities as well as an interactive database of knowledge and methods. Links will be established with national innovation projects and actors.

- 3. NBSOIL. The EU-funded project offers a blended learning programme to mainstream knowledge on Nature-based Solutions for soil management and help soil advisors implement a holistic vision of soil health. The project focuses on six multifunctional practices: organic fertilisers from locally available biowastes, cover crops, paludiculture, forest diversification, bioremediation, and blue and green infrastructure in urban and periurban areas.
- 4. LOESS. This Horizon Europe project aims to increase soil literacy by mapping, connecting and engaging relevant actors, target groups and other stakeholders. It will co-create tailored courses and modules, including the application of virtual reality, to address educational needs across different levels.
- 5. CURIOSOIL. The EU co-funded project aims to enhance soil literacy in society through multi-sensorial soil experiences, educational products, course materials and training programmes for educators.

- The EU Mission: 'A Soil Deal for Europe' (the Mission Soil) and its "multi-actor" approach: applying the "multi-actor" approach is required across most research calls within the EU Mission Soil. This approach allows for the co-creation of knowledge and encourages the exchange of best practices and innovative solutions among a diverse group of participants, including scientists, advisers, enterprises, and farmers. Embracing a bottom-up approach, the multi-actor method transcends conventional involvement of end-users solely through result dissemination or stakeholder surveys.
- EIP-AGRI Operational Groups support smaller-scale practice-oriented innovative projects that aim to co-create practical solutions for agriculture, forestry and rural communities. Currently, there are 15 EIP-AGRI Operational Group projects with relevance for regenerative agriculture, ranging in focus from regenerative grazing, viticulture, soil regeneration and climate-adapted regenerative agriculture.
- EIT Food has an active programme on Regenerative Agriculture, with a series of funded activities, which include Regenerative Agriculture Workshops for farmers, advisory programmes mentored by experienced regenerative practitioners and the creation of specific resources, the Regenerative Agriculture Guidebook to help build a European regenerative farming community.
- The European Alliance for Regenerative Agriculture (EARA) is an independent farmer-led coordination and political advocacy organisation taking an active role in the movement of regenerative agriculture at the European level. The Alliance aims to make the voices of farming pioneers central in relevant political discourses both on an EU and Member State-level.
- The European R&I partnership on agroecology living labs and research infrastructures started out from an initiative by the European Commission aiming to accelerate farming systems transition towards agroecology. The Partnership is committed to provide spaces for long-term, site-specific, multi-stakeholder and real-life experimentation, and direction for research activities on agroecology at the European and national levels.

Moreover, farmers who are the end-users of regenerative practices developed under these projects, will be more motivated to use the results, having contributed to planning, implementation, result dissemination, and potential demonstration of regenerative practices in the newly established Living Labs. By fostering a sense of co-ownership, farmers will perceive themselves as contributors to the solutions, having actively participated in project design and contributed valuable ideas and views.

Conclusions and recommendations

The majority of farmers are still in the initial stages of adopting regenerative agriculture, highlighting the challenges of transitioning to a more sustainable farming system. Changing farming systems is not just an agronomic or economic challenge; it involves a cultural shift and paradigm change, often driven by pioneer farmers rather than a top-down approach. Currently, access to information on regenerative agriculture is often facilitated by social networks, while the institutional education of future farmers often lacks up-to-date information on regenerative practices, leaving a significant gap in knowledge transfer and implementation.

Changing old farming practices requires a change of mindset, which should be facilitated not only by progressive farmers but also supported by well-functioning Agricultural Knowledge and Innovation Systems (AKIS). Effective platforms, reformed education, and credible advisors are crucial for disseminating up-to-date knowledge and practical solutions on regenerative agriculture. The wider adoption of regenerative practices could enhance farmers' resilience and address critical issues like climate change, biodiversity loss, and food security.

There is a need for a change of heart in farming communities, involving farmers, families, and surrounding communities, to create a more resilient and regenerative way of farming. The low percentage of young farmers below 35 reinforces the need for educational reform and investment in adult learning to mainstream regenerative practices. Widespread confusion still exists in society regarding the differences between organic farming, regenerative farming, integrated management, and agroecology, highlighting the importance of consumer education.

In our mini paper, best practices from Austria, Croatia, Estonia, Finland, France and Hungary showcase various approaches to integrating regenerative agriculture into education, research, and on-farm activities. National CAP networks should play a more active role in promoting regenerative agriculture by serving as platforms for knowledge dissemination and networking. EU-wide projects like Climate Farm Demo and Climate Smart Advisors, along with the multi-actor approach under the EU Mission Soil, hold promise for accelerating the adoption of regenerative practices by actively involving stakeholders and fostering co-ownership among farmers.

For the advancement of regenerative agriculture and for mainstreaming regenerative practices in Europe, authors of this mini paper have formulated the below general **recommendations**:

- Strengthen contacts between agricultural students, conventional farmers and regenerative farmers through e.g. practical on-field visits which should focus not only on techniques, but also on the whole system, as well as farmers` motivation and reasoning behind adopting regenerative practices;
- Serious games can be relevant tools to open minds to new approaches and practices;
- An EU-level e-course (for farmers, advisors, students) could be a useful tool to learn from other farmers` experience;
- Encourage and incentivise farmer-to-farmer knowledge exchange and co-learning;
- Make science-based up-to-date information available to advisors and enable them to "translate" this knowledge into practical guidance for farmers;
- Create initiatives that aim to improve communication, foster healthy relationships, and promote cooperation among farmers;
- Establish national-level databases or registries containing information about all regenerative farmers;
- Tailor channels of dissemination to farmers, consider involving various media such as TV, radio, podcast-series specifically designed for farmers.

Research needs from practice

Research is part of education as new solutions and knowledge are being developed through research and then new specialists are educated through university- or research-projects. Universities often get criticism over the lack of sufficient focus of their research on the real, everyday needs of farmers with the frequent consequence that students, farmers, advisors and politicians are not aware of the real environmental issues and available innovative solutions. Farmers often claim that they get very limited information regarding regenerative practices through universities, because they simply do not have knowledge, ongoing research or elements in the curriculum around this topic (especially on the importance and impact of animals in the farming system; but also on soil-related topics). Local context-specific research is rare, resulting in the lack of relevant and practical information and knowledge for different stakeholders. Due to these problems, young farmers, for example in Estonia, bring many foreign experts to their farms, because they have up-to-date and innovative knowledge and solutions. However, some claim that such knowledge is often not sufficiently validated under the local conditions.

Authors of this mini paper identified the below research needs from practice in the areas of education and knowledge-sharing:

1. ***Linking agricultural actors for the further development and mainstreaming of regenerative agriculture***

Currently, farmers are not sufficiently connected with advisors, scientists and decision-makers. Understanding the language of scientific knowledge is often challenging for farmers. Furthermore, farmers' needs do not always reach decision-makers. Advisors and the farm advisory system could provide a bridge between science and farming practice. A more effective, trust-based relationship between agricultural actors could potentially contribute to more impactful on-farm research as well, resulting in successful on-farm trials for the advancement of regenerative practices. Further research and strategic development are needed to understand and improve the dynamics between agricultural actors, identifying existing obstacles and developing the most effective forms of collaboration for the advancement of regenerative agriculture.

This proposed research need could provide a solution to a Europe-wide challenge with relevance to both crop and animal production farms.

2. ***Connecting regenerative farmers with consumers and bringing regenerative products to the market benefiting farmers` efforts***

At the moment, average consumers rarely have reliable knowledge about or access to products from regenerative farms which also results in the fact that regenerative farmers are not sufficiently recognised, their products do not have the deserved visibility and demand for. More research is needed on how to create a win-win situation in which both consumers and regenerative farmers benefit from an increased demand and improved access to high-quality regenerative products. This could potentially be achieved by better price offers and placement for such products, developing and incentivising short food supply chains, as well as by establishing a reliable and transparent certification system and labelling for regenerative products.

This proposed research need could provide a solution to a Europe-wide challenge with relevance to both crop and animal production farms.

3. ***Defining and measuring "improved soil health" and "more biodiversity"***

While the potential positive impact of regenerative farming practices on soil health and biodiversity is well-known and widely advocated, farmers at various levels of transitioning to regenerative agriculture need clear, science-based, locally validated and measurable indicators to assess the impact of their farming practices on soils and biodiversity. Research is needed in order to define what exactly "improved soil health" and "more biodiversity" mean on a farm level, how much the identified indicators are country-, region- and farm type-specific, what user-friendly, accessible and reliable methods exist to monitor and measure farms` performance against these indicators and of course, how various practices impact soil health and biodiversity and how to make this impact positive for regenerative systems.

This proposed research need could provide a solution to a Europe-wide challenge with relevance to both crop and animal production farms.

Ideas for innovative actions

1. ***Public platform to share knowledge and experience on regenerative agriculture***

The aim of the operational group would be to co-develop a publicly available platform and online decision-support tool with a multi-actor approach to provide access to common failures and successes in regenerative agriculture.

The proposed idea could provide a solution to Europe-wide challenge with relevance to both crop and animal production farms.

The main challenge is the lack of access to knowledge and practical experience on regenerative agriculture. The proposed platform would fill this gap and ensure its long-term sustainability through the multi-actor approach.

Proposed activities:

- Collection of existing best practices, common failures, tools, initiatives (e.g. FGs), practical tips and advice (with direct contact to experienced farmers and advisors);
- Development of an accessible, user-friendly platform;
- Identify potential networks (e.g. LEADER, EU & National CAP networks) and initiatives and develop a strategy to involve them in the dissemination, promotion and regular update of the new platform.

2. ***Enhancing the effectiveness and access of digital tools***

Digital tools in general can be cost-effective and impactful media to reach, influence, educate and guide users. When it comes to reaching and supporting farmers on regenerative agriculture, the access and usability of digital tools varies a lot, depending on farmers` age, level of education, technological background, available capacities and of course, their perception and trust in such tools.

The aim of this operational group would be to identify current obstacles and reasons behind potential resistance towards digital tools in the farming community and how these could be overcome and utilised for the benefit of farmers, sustainable production and the environment. Digital tools, similarly to the formerly recommended public platform, could be effectively utilised to share knowledge, experience, successes and common failures, and to connect farmers on various levels of their transition to regenerative practices.

The proposed idea could provide a solution to a Europe-wide challenge with relevance to both crop and animal production farms.

3. ***Creating safeguards and incentives for independent, science-based, up-to-date and practice-focused national farm advisory systems***

Today, a great share of farm advisors in Europe are in some way linked to commercial companies and interests, potentially putting the impartiality, science-based and effective nature of their advice to farmers at risk. In order to achieve the objectives set by the European Commission towards national farm advisory systems – namely, to improve the sustainable management and overall performance of farms by improving farmers` awareness of the relationship between farm and land management, as well as by delivering up-to-date technological and scientific information – Member State-level farm advisory systems need to become independent, science-based and practice-focused.

This operational group would focus on identifying existing obstacles and issues with the current advisory systems, collecting available best practices, safeguards and frameworks to achieve the overall objectives and to develop effective ways to integrate regenerative practices into the future farm advisory systems.

This proposed research need could provide a solution to a Europe-wide challenge with relevance to both crop and animal production farms.

Further innovative ideas :

- 'Interrail' for young people to visit and work on regenerative farms;
- Enabling young people to be ambassadors of regenerative agriculture (with social media tools etc.);
- 'Erasmus for farmers': incentivise farmers to participate in educational programmes and trainings (for life-long learning) - could be part of the national eco-schemes;
- Establishing and supporting a national networks of regenerative reference farms;
- Facilitate the creation of farmers' social networks for the implementation of regenerative agriculture practices.

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