THE COMMON AGRICULTURAL POLICY AND REGENERATIVE AGRICULTURE: OPPORTUNITIES AND BARRIERS FOR FARMERS

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ABSTRACT

The purpose of this research is to examine the effectiveness of the Common Agricultural Policy (CAP) in supporting regenerative agriculture (RA) in Austria. The CAP significantly shapes the Austrian agricultural sector, with subsidies comprising up to 40% of farmers' income. However, limited literature exists on the effects of the CAP on RA. The role of this study is to develop an understanding of the mechanisms of the current CAP 2023-2027 and their support of RA in Austria, considering the nature of RA and inherent challenges. The methodological approach adopted for this study involves a literature review, policy analysis, and semistructured interviews with two agricultural experts to understand the challenges of regenerative farming and identify the opportunities and barriers for farmers under the current CAP. The findings reveal that while the CAP offers increased funding for regenerative farming, significant gaps remain in addressing challenges and providing comprehensive support. The study further highlights a lack of financial assistance and high regulatory pressures, which fail to accommodate the diverse circumstances of farms and the constant innovation in RA. The data collected recommends developing a comprehensive funding scheme for RA, enhancing the flexibility and adaptability of policies, increasing the freedom for farmers, simplifying administrative processes, and fostering collaborative research and education and tailored consultation.

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LIST OF ABBREVIATIONS

Agri-environmental-climate measures (AECM)

Common Agricultural Policy (CAP)

European Union (EU)

Member States (MS)

Regenerative Agriculture (RA)

INTRODUCTION

In recent decades, European agriculture has undergone profound transformations. Traditional small, diversified, family-owned farms have expanded and increasingly shifted towards specialization and intensification (Manshanden et al., 2023). Adopting new technologies, including high-yield seeds, synthetic nitrogen fertilizers, pesticides, and specialized machinery, has significantly boosted agricultural yields and reduced the need for human labor (Manshanden et al., 2023). This transition has been driven by socioeconomic and technological forces and the influence of the European Union's CAP (Pe'er et al., 2020).

However, the productivity gains from these intensified farming practices have come at an environmental cost and the unsustainable use of natural resources has led to detrimental effects on ecosystems and biodiversity (Pe'er et al., 2020). Research indicates that EU policies have supported these farming practices that contribute to biodiversity loss, climate change, land degradation, and soil erosion (Lakner, 2021; Pe'er et al., 2019 & 2020; Scown et al., 2020). Compromising up to 40% of farmer's income in Austria, the effect of the CAP in shaping the Austrian agricultural landscape becomes clear. Despite various reforms incorporating environmental concerns into the CAP, these efforts have proven ineffective and insufficient (Pe'er et al., 2020). The Austrian environmental program under the CAP is a case in point, as it failed to halt biodiversity loss (Bergmüller & Nemeth, 2019). In light of these challenges, regenerative agriculture (RA) emerges as a promising sustainable alternative to modern farming since it prioritizes soil health and other environmental benefits, such as increasing biodiversity and supporting ecosystem services (Schrefeel et al., 2020).

Numerous studies have examined the effectiveness of the CAP in mitigating or reversing negative environmental impacts (Batáry et al., 2015; Bergmüller & Nemeth, 2019; Cuadros-

Casanova et al., 2023; Pe'er et al., 2019 & 2020; Schmid et al., 2007; Scown et al., 2020) and on behavioral factors that increase the uptake of sustainable farming (Bielski, 2023; Brown et al., 2020 & 2021; Defrancesco et al., 2008; Dessart et al., 2019; Jaime et al., 2016; Prager & Posthumus, 2010; Veise et al., 2016; Trujillo-Barrera et al., 2016). Limited research has focused on how well the CAP supports RA, especially how adequately it compensates for the challenges and losses regenerative farmers face. Considering stakeholder's perspectives is important for the effectiveness of environmental policies to avoid harming domestic industries or relocating production to areas with less stringent regulations (Cosbey et al., 2019). Also, due to the variations in agricultural conditions and the implementation of the CAP across Member States (MS), evaluating the CAPs impact on national levels is beneficial. Therefore, this study evaluates how successfully the implementation of the current CAP supports regenerative farming in Austria, considering farmers' challenges.

I adopted a qualitative research approach to address the central question for this research:

• Are the mechanisms of the new CAP effectively supporting and incentivizing RA, considering the nature of RA and the resulting challenges it poses to regenerative farmers?

The qualitative methods utilized in this research include an extensive review of the literature, policy analysis and semi-structured interviews. The study's participants are regenerative farmers, farming consultants and the chairmen of two of the biggest regenerative associations in Austria. Discussing insights derived from theory with regenerative farmers' experiences offers a comprehensive understanding of the complex effects of policies.

Firstly, I will shed light on the theoretical framework of agricultural development, emerging environmental problems, and RA as a sustainable alternative. Furthermore, I will discuss regenerative farming's challenges and policy recommendations from the literature. The next chapter will explain the CAP and analyze the new reform's support for RA. Finally, I will present the interview findings and offer recommendations to more effectively support farmers and encourage greater adoption of regenerative farming.

1. GUIDING PERSPECTIVES

In the following chapter, I will provide essential background information by reviewing the literature on RA and factors influencing farmers' decision-making. First, I will introduce RA as a sustainable alternative to conventional agriculture and provide a definition. Next, I will present insights from the literature that explain the challenges of regenerative farming and the policy recommendations to support RA and its adoption better.

1.1. Austria's Agricultural Landscape: Trends and Problems

After the Second World War, the industrial revolution of agriculture, known as the "Green Revolution," turned farms from complex ecosystems into specialized industrial operations, focusing on a few specific crops or livestock breeds (Durkin & McCue, 2021). Efficiency and output were boosted using external fossil fuel-based inputs such as synthetic fertilizers, pesticides, and other new technologies such as high-yield seeds and specialized machinery. This new industrialized system increased yields and decreased labor, producing abundant, affordable food. The specialiszation of the food system is also reflected in human nutrition; Only 12 species account for 75% of the human food supply (Manshanden et al., 2023).

The industrialization and intensification of agricultural systems led to significant environmental problems worldwide (Pe'er et al., 2020). The International Panel of Experts on Sustainable Food Systems identified agriculture as a leading driver of global land-use change and biodiversity loss (IPES 2019). Austria is not exempt from this trend and its negative effects. Despite the predominantly rural structure of Austrian agriculture, intensification and its environmental impacts have been evident in recent decades. Specialization and consolidation led to a 27% decrease in farms from 2004 to 2020, while the average farm size expanded by 22% (BML, 2021). Larger monocultural fields, less diverse crop rotations, and increased chemical inputs have negatively affected biodiversity. For instance, the bird population on farmland has declined on average by 40 % since 1998 (BirdLife Österreich, 2017). Land use change, such as the increased conversion of permanent grasslands-beneficial for carbon storage and soil fertility-to arable land, has resulted in a 61% reduction in carbon sinks since 1990 (BML, 2021). Furthermore, four groundwater bodies and 20 % of surface water are not in good ecological condition due to agricultural runoff containing residues from fertilization and pesticides (BML, 2021). Moreover, the soil, the essential foundation of agricultural production, is endangered. Soil fertility and structure deteriorated, and soil erosion has become a significant concern in Austria's agricultural sector. Austria experiences a mean soil erosion of 7 tonnes/ha per year and is thus the EU country with the third highest soil water erosion (Eurostat, 2019). In Austrian mountainous regions such as Oberkärnten, erosion rates can exceed 20 tons per hectare per year (Eurostat, 2019). Especially in times of increasing climatic challenges, intact soil is important to maintain the resilience of farming systems and secure the viability of farms and food production. With an increasing population, one of the key challenges of our time is to produce enough safe, affordable and nutritious food sustainably without exceeding planetary boundaries (Schrefeel et al., 2020). International and European treaties and policies also acknowledge this need, for example, in the Paris Climate Agreement, the EU Green Deal and the EU Farm to Fork Strategy (European Commission 2022a).

Agriculture is an important sector for Austria accounting for 2.5% of Austria's total gross value added, more than the EU average (European Commission, 2023b). 75% of the country's area is classified as rural. Austrian farms are typically small-scale and family-owned. There are approximately 110,000 farms in Austria, with an average size of 23.5 hectares (European Commission, 2021). Geographically, they are primarily located in areas with natural constraints, such as mountainous regions. These conditions underline the importance of the

CAPs support for rural areas and areas with natural constraints to support the viability of Austrian agriculture. In general, the Austrian farming sector heavily depends on CAP subsidies. For example, the average farm's share of direct payments from farm income is around 20%, up to 40% for large farms (Eurostat, 2024). Therefore, subsidies markedly influence the Austrian agricultural sector and can act as a steering element.

1.2. Sustainable Farming: Regenerative Agriculture

Many scholars, practitioners and international bodies consider RA and its practices an important approach for a sustainable food system (Schreefel et al., 2020) since it potentially has lower negative environmental impacts than conventional farming or even net positive ones (Netwon et al., 2020). The Intergovernmental Panel on Climate Change acknowledged RA as a farming method that "can be effective in building the resilience of agroecosystems" (IPCC, 2019). Also, the CAP promotes many RA practices as good agricultural practices (AMA, 2024c). Environmental benefits include increased carbon sequestration, enhanced biodiversity and improved soil health (Newton et al., 2020). Benefits for farming systems include increasing the long-term resilience and yield stabilities of farms by, for example, decreasing soil erosion and depletion, minimizing fossil-fuel-based inputs and producing healthy, high-yielding crops with fewer weeds and pests (Netwon et al., 2020; Schreefel et al., 2020). However, the promising claims about environmental benefits can vary in different contexts and need to be backed up better with empirical evidence (Newton et al., 2020; Khangura et al., 2023).

Recently, RA has gained popularity among many stakeholders (Newton et al., 2020), surpassing other terms in the literature since 2015 (Giller et al., 2021) and is also gaining traction in Austria as a sustainable farming alternative. Many associations and initiatives (e.g., "BodenistLeben," "HumusBewegung," "Ökoregion Kaindorf") encourage regenerative practices, engage in research and support farmers through workshops, webinars, and hands-on training. Due to the potential and popularity of RA also in Austria, the thesis will focus on this concept as a sustainable alternative to conventional farming.

1.2.1. Defining Regenerative Agriculture

The Rodale Institute in the US made RA popular through its research in the 1980s (Khangura, 2023). Until today, RA lacks a singular legal or regulatory definition (Schreefel et al., 2020). To attempt a definition, Schreefel et al. (2020) reviewed the literature and categorized commonly mentioned activities and goals. The study concluded that the main concerns of RA include soil health, biodiversity, and the promotion of ecosystem services. Consequently, they propose defining RA as "an approach to farming that uses soil conservation as the entry point to regenerate and contribute to multiple ecosystem services" (Schreefel et al., 2020).

Problems with a clear definition might also stem from the nature of RA. A report about RA in Europe concluded that RA is more defined by outcomes than by specific practices and is not a prescriptive method, providing freedom for farmers to adjust practices to their local context and advocating for an EU-wide indicator system (Manshanden et al., 2023).

Only focusing on desired outcomes would be too broad for analyzing the CAPs support for regenerative farmers. Therefore, I will explain RA by complementing desired outcomes with core principles and key practices (see Figure 1). The principles and practices of RA are based on natural systems and biological and ecological processes and aim to promote soil health, increase biodiversity, support ecosystem services, sequester carbon and enhance farms' resilience. Five key principles were identified from different reviews (Khangura et al., 2023; Manshanden et al., 2023; Newton et al., 2020; Schrefeel et al., 2020): First, minimizing soil disturbance, including reducing tillage and chemical inputs, helps maintain the soil in a good biological (e.g., microorganisms, soil respiration), chemical (e.g., nutrient content, soil pH) and physical (e.g., soil structure) condition. Second, increasing crop diversity enhances the system's

resilience to pests and diseases, supports biodiversity, and enriches the soil. This can be achieved through diverse crop rotations and configurations, such as intercropping. Third, maintaining the soil covered improves nutrient cycling, reduces evaporation, and inhibits weed growth, thereby protecting and nourishing the soil. Fourth, keeping living roots year-round ensures a continuous nutrient supply for soil life and improves soil structure, thus improving water retention and preventing erosion. Fifth, integrating livestock into the farming system improves nutrient cycling and reduces external inputs (Manshanden et al., 2023).

The desired outcomes, core principles, and key practices identified from the literature (Newton et al., 2020; Schrefeel et al., 2020; Khangura, 2023; Manshanden et al., 2023) are summarized in the following figure:



Figure 1: Desired Outcomes, Core Principles and Key Practices of RA Created by the author based on Newton et al. 2020; Schrefeel et al. 2020; Khangura 2023; Manshanden et al. 2023.

Many RA practices, which are well-established good farming practices, are also utilized in conventional farming and share common ground with other sustainable farming techniques, such as conservation agriculture, organic farming, agroecological farming, climate-smart agriculture, permaculture or nature-based farming (for more detailed information on similarities and differences, see Manshanden et al., 2023 & IPES, 2022). The terms are often used interchangeably by researchers, governmental bodies, environmental organizations, and the agrifood industry (IPES, 2022). The meaning and usefulness of the abundance of overlapping terms and concepts are contested; the lack of a clear definition has several drawbacks, including the risk of greenwashing and confusion about its benefits (IPES, 2022). Therefore, it is crucial to establish clear definitions to avoid these pitfalls and ensure the integrity of sustainable agriculture practices.

1.3. Regenerative Farmers' Challenges and Policy

To understand how adequately the current CAP provides support and incentivizing mechanisms, I will identify the challenges of regenerative farming, especially during the conversion process. Based on a literature review, I will lay out the challenges and barriers of RA and the policy recommendations for improvement.

1.3.1. Economic Challenges

Recommendations

Transitioning to sustainable farming methods, such as RA practices, often results in yield loss, reducing the competitiveness of farms (Roest et al., 2017). This yield loss is particularly pronounced during the initial conversion period. Research has shown that sustainable farming is riskier than conventional due to higher market fluctuations, higher uncertainties about the effect of practices and the variability of the soil's reaction (Dessart et al., 2019). High initial

costs for new equipment, such as direct seeding machines or post-harvest handling facilities, pose another challenge (Carlisle et al., 2019). Diversification of farms requires diverse and appropriately scaled equipment and machines, which are only used at specific times for specific crops, thereby increasing financial burdens and labor demands (Giller et al., 2021; Gosnell et al., 2019; Khangura et al., 2023). Limited market access and consumer awareness of sustainable practices like RA reduce the financial viability of such practices (Kotyza & Smutka, 2021). While organic farming has benefited from the EU organic label, other sustainable practices and their benefits remain largely unknown (Padel et al., 2015). Additionally, the consolidation trend in agriculture increased the number of agricultural land renting rather than owning land, diminishing farmers' autonomy and long-term decision-making incentives (Carlisle et al., 2019). This situation could be more problematic for regenerative practices, which often require significant initial investments and have delayed benefits, such as soil improvements taking years to show results (Carlisle et al., 2019).

Financial compensation for lost yields, increased costs, and investments are essential to making RA profitable and attractive (Brown et al., 2021). This compensation should be tailored to cover direct and indirect costs, such as opportunity costs and consultancy fees and compensate for the time needed to learn new practices (Prager & Posthumus, 2010). Also, compensating for involved risks and the fear of sanction is important (Dessart et al., 2019). Fixed and regular payments and early-stage compensation are crucial for farmers to overcome biases towards immediate costs over long-term benefits (Dessart et al., 2019). Payments based on practices rather than results are preferable. Implementing risk management tools such as insurance against yield loss and offering free trials for farmers to test and learn sustainable practices can mitigate perceived risks and encourage experimentation (Dessart et al., 2019). Also, increased spending on AECM can increase the uptake of sustainable practices (Jaime et al., 2016).

1.3.2. Educational Hurdles

RA requires extensive knowledge and a deep understanding of soil science and other natural processes, and adopting new practices such as crop diversification and integrated pest management involves steep learning curves. It can substantially challenge farmers (Carlisle et al., 2019). Also, RA is an evolving field that requires additional research and experimentation (Khangura et al., 2023). Initial experimentation is required to determine what works best in one farm's context, requires continuous learning and adapting and brings a high uncertainty regarding crop performance and yield (Giller et al., 2021; Gosnell et al., 2019; Khangura et al., 2023). Furthermore, incentivizing learning and training efforts can facilitate the adoption of regenerative methods because it increases the awareness of environmental issues and RA's benefits (Brown et al., 2021; Dessart et al., 2019; Trujillo-Barrera et al., 2016). Including farmers in the process enhances the implementation, facilitates communication and learning, promotes adaptive management and gives farmers a sense of control (Pe'er et al., 2022).

Hence, the extension of collaborative and improved education and advisory services tailored to farmers' local contexts and specific issues is essential. Incorporating regenerative practices into agricultural education and offering continuous training and consultations are vital (Carlisle et al., 2019). The support for local action groups and farmers' engagement programs should be promoted (Pe'er et al., 2022). Additionally, timely information about subsidy schemes is important for farmers (Dessart et al., 2019). Improved environmental and farming education should also be extended to consumers to raise awareness and willingness to pay, thereby expanding the market for regenerative products (Brown et al., 2021; Dessart et al., 2019). Certification schemes, like the EU organic label, can further increase awareness and market growth for RA products, as demonstrated by the global expansion of organic agriculture (Elrick, 2022).

1.3.3. Social Barriers

Social norms and peer influences play significant roles in farmers' decision-making. In many regions, traditional farming practices are deeply ingrained, and community acceptance of new methods can be slow. Farmers may face peer pressure to stick with conventional methods and hesitate to adopt practices perceived as experimental or risky (Veisi et al., 2017). Traditional notions of success based on high production and a preference for tidy farms further complicate the shift (Gosnell et al., 2019).

Farmers are more likely to adopt sustainable practices if they perceive their peers are doing the same or if they can communicate their adoption of these practices (Dessart et al., 2019). Bottom-up initiatives and a collaborative approach to teaching and research, rather than a top-down approach, can help counteract resistance to change (Veisi et al., 2017). Additionally, increasing ecological payments when more farmers participate can help overcome social and cultural barriers (Bell et al., 2016). Allowing farmers to share their efforts and benefits makes them more likely to change their behaviors, making certification schemes crucial.

1.3.4. Burdens in the Subsidizing System

Also, research found that the complexity and administrative burden of applying for and complying with environmental subsidy programs can be overwhelming, hindering the adoption of sustainable practices (Brown et al., 2021; Dessart et al., 2019). Simplifying agrienvironmental schemes and reducing administrative burdens can lower perceived lack of control and risks that act as barriers to adopting sustainable practices (Defrancesco et al., 2008). Flexible and locally adjusted measures can enhance participation and address local conditions and developments in RA (Geitzenauer et al., 2016; Pe'er et al., 2017; Sutcliffe et al., 2015). Examples of enhancing policy flexibility include allowing farmers to opt in and out of contracts annually, choosing how much land to farm using certain methods, loosening requirements such as specific practice dates, quickly incorporating new research findings into policy frameworks, and simplifying the change process (Dessart et al., 2019). These measures can make policies more adaptable and responsive to farmers' needs, encouraging greater adoption of sustainable practices.

In summary, starting from soil health, RA aims to establish a sustainable and resilient agricultural system that harmonizes with natural processes. This approach provides long-term environmental benefits while maintaining productive and profitable farming operations, addressing many challenges of the current food system. As a recent and evolving sustainable farming concept, RA lacks a clear definition and requires more research to assess its potential and benefits and to facilitate its adoption.

Regenerative farming faces numerous challenges and barriers within the current economic, political, and social context, including economic and educational challenges, social and cultural barriers, and complex policy environments. To address these challenges and increase the adoption of regenerative farming, adequate financial compensation and incentives, increased collaborative bottom-up research and education, tailored consultations, and simplified, flexible policy environments are essential.

2. THE COMMON AGRICULTURAL POLICY: ANALYSIS

This analysis evaluates the current CAP, focusing on Austria. First, I will introduce and explain the CAP and then examine key reforms and measures of Pillar 1 and 2 of the new CAP in Austria, assessing its support for RA.

2.1. The European Union's Common Agricultural Policy

The CAP is one of the world's largest agricultural policies, consuming 24% of the EU's budget and thus being the most expensive policy in the EU (European Commission, 2022b; Cuadros-Casanova et al., 2023). It is primarily a funding policy divided into two pillars (European Commission, 2022b):

- **Pillar 1**: Provides income support for farmers and funding for market measures.
- **Pillar 2**: Supports rural areas, areas with natural constraints, organic farming, agrienvironment-climate measures (AECM), and protected areas like Natura 2000.

Established in the Treaty of Rome of 1957, the CAP was initially designed to secure stable food supplies and farmer incomes (Pe'er et al., 2020). Over time, it has been reformed to adapt to changing conditions and emerging challenges. Despite all the reforms, the CAP has been widely criticized for promoting ecologically harmful agricultural intensification (Pe'er et al., 2019) and its uneven distribution of benefits (20% of the farmers receive 82% of the direct payments) (Scown et al., 2020). The support of income does not necessarily target farms with the highest income variability and has disproportionally favored large inputintensive farms (Guth et al., 2020; Scown et al., 2020). For example, a study analyzing the distribution of \in 59.4 billion in 2015 CAP payments found that more than \notin 24 billion in direct payments went to areas with farm incomes above the EU median income and high

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greenhouse gas emissions (Scown et al., 2020). Research examining the environmental effects of the CAP claims that the payments under the first pillar are mainly harmful to the environment and that the CAP has failed to halt or reverse biodiversity loss or other negative environmental outcomes (Pe'er et al., 2019 & 2020). Recent efforts, such as the 2014-2020 reform introducing Greening measures for direct payments, have been ineffective due to broad exemptions, insufficiently stringent requirements and disproportionate allocation to environmentally ineffective or harmful policy measures (Lakner et al., 2017; Pe'er et al., 2019 & 2020). Measures, such as the AECM, are considered environmentally effective, but not enough payments are allocated to them (Batáry et al., 2015; Pe'er et al., 2019 & 2020).

2.2. The New CAP 2023-2027 and Regenerative Agriculture

The current CAP 2023-2027 was adopted in 2021 to address environmental, social and economic sustainability, and entered into force in 2023, claiming to be "greener, fairer and more competitive" (European Commission, 2022a). It aligns with the European Green Deal, the Biodiversity Strategy 2030 and the Farm to Fork Strategy; therefore, the current CAP is intended to contribute to meeting important biodiversity, climate change mitigation and other food system-related environmental goals, such as increasing the share of organic farming to 25% until 2030 (Pe'er et al., 2022).

Key reforms in the CAP 2023-2027 include higher green ambitions requiring EU countries to set and update plans to meet environmental and climate goals (European Commission, 2022a). These plans include setting stronger environmental requirements for receiving CAP payments and increasing the payments allocated to environmental measures. For example, at least 25% of the Pillar 1 budget must be allocated to Eco-schemes, and compared to 28% in the previous period, 35% of Pillar 2 must be for AECM (European Commission, 2022a).

The CAP has been transformed into a result-based policy to enhance its effectiveness in achieving environmental ambitions (European Commission, 2022a). This involves developing a set of indicators and monitoring through annual performance reports and biannual reviews of the strategic plans. Furthermore, the "no backsliding clause" obliges MS to go further than in previous years regarding environment and climate measures (European Commission, 2022a).

The reforms also emphasize fairer support, such as redistributing income support to smaller farms, linking payments to labor standards, and improving gender balance. To boost competitiveness, the CAP enhances farmers' bargaining power, maintains market orientation, and establishes a crisis reserve (European Commission, 2022a).

Another key reform of the new CAP is increased flexibility, requiring each member state to develop its strategic plan to implement, finance, monitor, and evaluate the CAP within its respective country (European Commission, 2022a). This new flexibility allows MS greater latitude to accommodate their unique conditions and circumstances.

Austria's strategic plan to implement the CAP was submitted to the European Commission following comprehensive stakeholder involvement and was approved in September 2022 (Landwirtschaftskammer Österreich, 2022). The extensive plan, comprising 1400 pages, analyzes the current situation and identifies key necessities. Based on this analysis, the plan outlines 98 interventions to implement the CAP in Austria, addressing these necessities (BML 2021). It also establishes indicators to measure results, ensuring that the objectives of the CAP are met effectively.

The CAP in Austria is funded with 8.8 billion euros from European and national sources, amounting to 1,860 million euros annually (Landwirtschaftskammer Österreich, 2022). The goals of the CAP in Austria include enhancing the sustainable competitiveness and resilience of farms, ensuring food security for the population, advancing research and innovation,

improving the quality of life in rural areas, and protecting natural resources and the climate (European Commission, 2023b).

The increased environmental goals and efforts can be seen as beneficial for RA as many environmental or "good agricultural" practices of the CAP align with RA practices (AMA, 2024c). The new CAP objectives overlap with the goals and benefits of RA, such as climate and biodiversity protection and enhanced farm resilience. The national strategic plan and the result-based performance reports allow for a more flexible policy system and incentivize adaptive management, which might be advantageous for the evolving and diverse needs of regenerative farming and may offer ways to compensate for environmental benefits financially. However, result instead of action-based compensation might also increase the risk for farmers, discouraging the adoption of RA (Dessart et al., 2019). Despite the shift towards a result-based policy, most CAP payments in Austria remain bound to actions instead of outcomes (AMA, 2024a).

2.2.1. Pillar 1

Pillar 1 of the CAP in Austria includes 12 interventions, totaling 678 million euros annually, constituting 68% of the total funding (Landwirtschaftskammer Österreich, 2022). This is 14.7% less than in the previous CAP period. Direct payments amount to ϵ 208 per hectare, compared to ϵ 288 per hectare in the previous period (including Greening payments) (Kirner, 2024). The new CAP also emphasizes redistributive efforts and provides increased support for small farms, as well as better-targeted support for specific sectors, such as alpine pastures (European Commission, 2023b). The Austrian plan allocates more direct payments to small and medium-sized young and female farmers (AMA, 2024a). For example, for the first 20 hectares, an additional ϵ 44 per hectare is paid, and for hectares 20-40, an additional ϵ 22 per hectare is paid. There is an upper limit for receiving direct payments set at ϵ 100,000 after

deducting labor costs. Young farmers receive an additional €67 per hectare (AMA, 2024a). Also funded from the first pillar are market measures to make Austrian products more competitive.

Thus, the CAPs first pillar continues to provide farmers with important income support through direct payments. Studies found that direct payments enhance farms' economic viability and stability, including small and middle-scale farms (Artiom et al., 2019; Severini et al., 2021; Volkov et al., 2019). The higher redistributive efforts also mitigate economic pressures and financial risks, enabling farmers to experiment and adopt new practices.

Furthermore, to enhance environmental sustainability, receiving direct payments is contingent on "enhanced conditionality," which encompasses ecological, animal welfare, plant and human health requirements (European Commission, 2023b). In addition to the 'enhanced conditionality,' 15 % of the money from the first pillar is allocated to voluntary eco-schemes (Landwirtschaftskammer, Österreich 2022). These eco-schemes include four interventions intended to benefit the environment and animal welfare: Cover crops, permanent living roots in the soil, animal welfare on pastures and erosion protection measures for orchards, vineyards and hops (AMA, 2024c).

The enhanced conditionality and eco-schemes support practices, such as diversifying crop rotation rules, using cover crops and reducing soil disturbance (AMA, 2024c). These practices overlap with important RA principles and practices, thereby enhancing the economic sustainability of regenerative farming and incentivizing its adoption (see Table 1 for more details).

2.2.2. Pillar 2

Pillar 2 encompasses 42 interventions and consumes 60% of the total subsidies, an increase of 30% compared to the last period (Kirner, 2024; Landwirtschaftskammer Österreich, 2022). Twenty-one interventions, accounting for 40% of the budget, are directed at AECM. These interventions cover environmental measures for arable land, grassland, animal welfare, permanent crops, and protected areas such as Natura 2000 (European Commission, 2023b). Combined with the four eco-scheme interventions from Pillar 1, these form the ÖPUL 2023, the Austrian agri-environmental program (AMA, 2024c). Most measures will receive increased or expanded financial support compared to the previous CAP period (European Commission 2023b). For example, environmentally friendly and biodiversity-promoting farming will receive an increase of nearly €39 million, raising the base premium from €45/ha to €70/ha (Landwirtschaftskammer, Österreich, 2022).

Given the increased funding, payments from Pillar 2 might also positively impact the economic sustainability of farms, especially when using environmental practices. The increased spending on AECM provides numerous opportunities to support RA practices, such as enhancing biodiversity through diverse crop rotations, creating biodiversity areas, integrating landscape elements like trees and bushes, and using regional and valuable seeds. It also includes reducing soil disturbance by restricting synthetic fertilizers and pesticides, minimizing tillage, using mulching and direct seeding, and encouraging practices like maintaining cover crops and integrating livestock on pastures (see Table 1).

The measures of pillar two and the eco-schemes of pillar 1 are voluntary and offer farmers a modular approach to choose only measures suitable for their context. However, some are interdependent or require certain preconditions. In general, this might give farmers increased freedom and flexibility, which is beneficial for RA's evolving and variable nature and the

unique circumstances of farms. The regional result-oriented projects focused on environmental indicators make the policy more targeted towards regional contexts and focused on results. This attention to environmental benefits might help compensate for the positive externalities on public goods provided by RA.

Furthermore, one-fifth of the budget of Pillar 2 is allocated as a compensatory allowance for farms in areas with natural constraints. The amount paid (minimum €25/ha up to 70 hectares) depends on practices, size, and natural conditions such as soil and climate (Landwirtschaftskammer Österreich, 2022). This support increases the viability of family-owned small-scale farms and decreases economic pressures. Additional supports financed from this pillar include: Support for young farmers, livestock grazing on pastures, food quality regulations, research and education, diversification activities, and non-agricultural interventions such as consumer awareness campaigns (Landwirtschaftskammer Österreich, 2022). Also, investment support is offered, including non-productive investments aimed at improving sustainability (e.g., direct seeding) (AMA, 2024b). Improving education and research, supporting non-productive investments, increasing consumer awareness, advancing rural development and areas with natural constraints, and encouraging generational succession might benefit RA as they strengthen the farming sector and may address the economic and educational challenges of regenerative farming.

The following table shows an overview of interventions from Austria's CAP 2023-2027 implementation from both pillars that support RA principles and practices (marked green):

Policy Measures CAP 2023-2027 Austria	Minimize Soil Disturbance	Increase Diversity	Maintain Soil Cover	Keep Living Roots	Integrate Livestock
Pillar 1					
'Enhanced Conditionality' of Direct Payments					
Eco-Schemes					
Differentiation of Basic Income Support					
Pillar 2					
Environmentally Friendly and Biodiversity- Promoting Management					
Restriction of Yield- Enhancing Inputs					
Hay Farming					
Nature Conservation: WFD, BHD, Natura 2000					
Hummus conservation & soil protection on convertible grassland					
Preventive Groundwater Protection - Arable Land					
Conservation of Endangered Livestock Breeds					
Organic Farming					
Erosion Protection and Herbicide/Insecticide Avoidance in Hops, Vineyards, and Orchards					

Table 1: Interventions of the current CAP in Austria supporting RA

Created by the author based on an analysis of Agrarmarkt Austria (AMA) information sheets on the CAP interventions and supported practices in Austria.

2.2.3. Persisting Criticism

However, criticism on the reformed CAP persists. Changes are not substantive enough to address the substantial sustainability challenges and support the objectives of the European Green Deal or the Sustainable Development Goals. (Pe'er et al., 2022; Scown et al., 2020). The legislation still subsidizes the extensive use of synthetic inputs and fails to support organic farming properly (Cuadros-Casanova et al., 2023). Funds should be assigned more proportionally to each objective, and environmental performance monitoring has to be improved (Cuadros-Casanova et al., 2023). The effectiveness of environmental measures varies by region and requires improvement such as better consideration of local conditions and variations (Bielski, 2023). Also, the flexibility of MS poses the risk of watering down environmental efforts with unambitious national strategic plans (Pe'er et al., 2020). Furthermore, one study about farmers' opinions revealed that farmers still desire more stable prices and equitable competition conditions in the food supply chain (Hupková et al., 2023).

In summary, the CAP reform in Austria significantly enhances support for RA by an increased focus on environmental goals and indicators and the provision of increased financial incentives for many RA practices. Also, offering greater flexibility for farmers to choose measures suited to their unique contexts is beneficial. The improved distribution of payments might positively improve the viability of all farms. Funding for education, research and innovation and payments for rural areas and areas with natural constraints might positively contribute to enable regenerative farming through addressing educational and mitigating economic challenges. However, ongoing challenges such as distributive inequalities and the persisting failure of substantial changes to effectively address or reverse environmental outcomes might indicate a lack of sufficient compensation for regenerative farming.

3. FINDINGS AND DISCUSSION OF THE INTERVIEWS

This chapter presents the interview findings, including criticisms and recommendations, and discusses them with previous findings.

3.1. Financial Compensation

Both experts acknowledged the positive development of the new CAP and its increased funding for regenerative practices such as cover crops, mulch and direct seeding. They highlighted the crucial financial support provided by the CAP and its potential as a significant steering element, aligning with literature emphasizing financial support's importance in promoting sustainable agricultural practices (Brown et al., 2021).

However, both experts noted that financial assistance often falls short. For instance, aid for mulch and direct seeding is limited to erosion-prone crops, and advanced efforts of regenerative farmers, such as intercropping or agroforestry, do not receive support. Also, subsidies have not kept pace with inflation, reducing their effectiveness. Expert 2 remarked: "The premiums have been more or less unadjusted since the 90s... the value of what you get there is no longer the same as it was 10-15 years ago." Additionally, CAP subsidies only "compensate for forgone profits and increased costs" and do not reward ecosystem services due to challenges in measuring and controlling them. This neglects the positive externalities of regenerative farming. Echoing the literature, the experts emphasized the need for mechanisms that award the environmental benefits of sustainable practices (Jaime et al., 2016).

Expert 2 criticized the current scattered support for regenerative practices:

[&]quot;Some say you can apply for the cover crop subsidy here, and you can apply for the direct seeding subsidy there. Yes, that's true, but just, e.g., only for erosion-prone crops and not for other things (Expert 2)."

He suggested a solution for a funding scheme for RA, similar to organic farming, This scheme includes mandatory principles such as minimum soil disturbance, biodiversity improvement, and continuous soil coverage. Additional optional financially supported points, like no-till farming, agroforestry, and mob grazing, could provide flexibility within the framework, and offer additional compensation, and incentives for farmers "aiming higher." He proposed:

"The three principles of regenerative agriculture are mandatory, and everything else are points from which the farmer must choose... if someone does that, no matter what he grows, he now takes care of his plants in a regenerative way, and then he gets paid per hectare (Expert 2)."

3.2. Regulatory Pressures

The interviews also revealed significant concerns about increased restrictions and requirements under the new CAP. Measures such as enhanced conditionality promote RA principles such as cover crops, but they are just stricter basic requirements for receiving basic payments. Expert 2 emphasized the restrictive nature of these regulations for a Pillar 2 payment:

"Indirectly, there are still ... well, you can't call it promotion ... it's actually prohibitions. You must work erosion-preventively from a certain slope gradient; otherwise, you won't get the UBB premium in that area. That's not how you lure all farmers out from behind the stove (Expert 2)."

Expert 2 referred to the current CAP as a "tight corset" with very specific requirements, such as specific dates for planting and removing cover crops or bringing out fertilizers, undermining the diverse conditions of farms, such as high variances in soil and weather conditions. Both interviewees emphasized the significant differences in farm conditions within Austria and even between single farms. Expert 1 pointed out, "Regenerative farming cannot be done by dates. It must be done according to phenology. By feeling, by the soil (Expert 1)".

Furthermore, both experts expressed concerns about the increased pressure to comply and the fear of penalty, especially considering the extreme surveillance mechanisms and frequent checks of the CAP.

"When you talk to farms, the main problem is all the checks... the criminal aspect is emphasized, and not that the farm just wants to operate normally. The difficulty is always the sword of Damocles hanging over you. I get money, and if it goes wrong, I might have to pay it back years later. The pressure on farmers is enormous. They no longer have the opportunity to try anything (Expert 1)."

Pressure limiting farmers' ability to experiment and take risks is consistent with literature indicating that increased pressure and risks discourage the adoption of sustainable practices (Dessart et al., 2019).

Moreover, both experts criticized the complexity of the current system and the administrative burdens of applying for and complying with subsidy programs. It can be overwhelming for farmers, further complicating the adoption of new practices and deterring participation in subsidies that support them. Confirming the findings of the literature (Defrancesco et al., 2008), according to the experts, reducing regulatory pressures and bureaucratic hurdles should be a priority in future reforms. Expert 1 emphasized: "I have to make the processing easier. People always talk about cutting bureaucracy, and that's what I wish for."

3.3. Flexibility and Adaptivity

Both emphasized the variability of regenerative practices depending on the local circumstances and the continuous experimentation and innovation in the field, highlighting the need for flexible and adaptive policies. Expert 2 noted: "It's a living and developing system. We haven't found the philosopher's stone yet." He mentioned that many aspects are still unclear and need further research. Years of experimentation are often required with setbacks to find what works best for a farm. "Every year, you find something new that works better." Hence, experts emphasized the need for flexibility and less stringent requirements to accommodate these variances and differences and enable experimentation. Expert 1 noted: "What is needed in the future is that farmers in the 'Mehrfachantrag'¹ have a box to check 'I want to try something.' Regenerative farmers need the freedom to try and experiment." Furthermore, they suggested more adaptive policies, allowing farmers to choose their planting and removal dates of cover crops and get compensated accordingly for environmental benefits. Expert 2 emphasized the need for result-oriented policies to compensate for ecosystem services, suggesting a funding concept that is as free as possible and allows for adjustments during the period. This is also compatible with the research claiming that RA is not prescription-based (Manshanden et al., 2023) and thus requires adaptive management. However, this contrasts with the findings on farmers' decision-making, which emphasize the increased risk for farmers coming with result-based policies, negatively influencing the uptake of sustainable farming (Dessart et al., 2019). This might indicate the need for a combination of result-based and action-oriented subsidies to avoid risks and maintain flexibility.

3.4. Social Influences

Social norms and peer influences were repeatedly mentioned as barriers but also potentials for change, confirming findings from the literature. Expert 2 noted:

"Earlier, they laughed at me, and now many are copying me. An idea that comes new is first rejected, then vehemently fought against, and in the end, it was always known that it was the best thing (Expert 2)."

Additionally, the focus and value of farmers must shift. Expert 1 noted that attitudes must shift from "soil exploitation" and high yields to increased attention on soil fertility and the nutrient

¹ Mehrfachantrag is the form Austrian farmers must fill out when applying for CAP subsidies.

content of products. According to Expert 2, making farmers realize there needs to be a change is one of the biggest hurdles.

3.5. Education and Consultation

Therefore, the interviews revealed the crucial need for extended education and advisory services about regenerative farming, mirroring the findings of the literature (Dessart et al., 2019). Expert 2 mentioned that curriculums are outdated and need to incorporate RA, and individual consultations must be tailored to the farm's specific problems and affordable. Also, Expert 1 noted:

"I believe that accompaniment for the operations dealing with the topic is the most important. But the truth is no one can afford that. That's the problem. What does the farmer do when he stands outside in the field alone and has to decide? He needs someone (Expert 1)."

Expert 2 noted that many farmers revert to conventional methods if something does not work in the first years and emphasized the need for consultation especially during these difficult periods to help farmers learn from mistakes and improve their techniques. He emphasized the variability of solutions and the challenges in the initial stage of converting:

"This variability is a problem for many, mentally. Because they are entering a new territory and the terrain is completely unknown. Having three or four different plans in the back of your mind for the same thing is difficult for most. You only get to the goal via detours. That's the biggest hurdle (Expert 2)."

Farmers need to change their thinking, moving away from "recipe thinking" to trying new things and having multiple plans for contingencies.

3.6. Certification

Another recurring topic was concerns about the inconsistent application of regenerative practices and the risk of harmful practices, such as using broad-spectrum pesticides, being

labeled regenerative. The literature emphasized certification to ensure sustainable practices and enhance consumer trust (Elricke et al., 2022), however Expert 1 expressed concern that regulating RA could exclude many farmers from the movement:

"It has pros and cons. [...] You can say that Regenerative can only be organic, but we have 50 percent conventional operations in the Humus Movement, so I have to exclude all of them? Although they make an effort? Also, it would make the transition process more difficult (Expert 1)."

Thus, while certification remains important for increased consumer awareness and the prevention of greenwashing, the potential negative effects on the uptake of RA should be addressed and further investigated.

Overall, the interviews' findings backed the literature on sustainable farming and farmers' decision-making and on the policy analysis. The experts acknowledged the increased support for RA but reported a lack of comprehensiveness, such as missing compensation for all RA practices and the environmental benefits. They emphasized the negative effects of the current high regulatory pressures, the system's complexity and bureaucratic hurdles, and the need for more flexible and adaptive subsidy schemes. Also, the need for improved education and consultations and the barrier and potential of social influences were mentioned. Open questions remained regarding the effect of result-based policies on flexibility vs. risk mitigation and possible negative effects of certification, requiring increased future attention and investigation to address possible unintended effects.

The following figures 2-5 summarize the study's findings including findings from the literature review, the policy analysis and the interviews.



Figure 2: Challenges of Regenerative Farming



Figure 3: CAPs Support for RA



Figure 4: CAPs Barriers and Gaps for RA



Figure 5: Policy Recommendations for Improved Support

CONCLUSION

This research was undertaken to evaluate the potential of the current CAP in aiding the transition to RA in Austria. While the current CAP increasingly allocates payments to environmental measures and thus supports many RA practices, several improvements are required to align CAP policies with the needs of regenerative farmers and facilitate the transition to RA. Financial support and incentives must be more comprehensive, meaning supporting all regenerative practices and compensating for positive environmental externalities of RA. The findings of the study suggest that flexible and adaptive policies are crucial to allow farmers to adapt practices to local conditions and the constant new findings and innovation in the field of RA. Empowering farmers by involving them in the process and reducing financial and regulatory pressures and bureaucratic burdens might increase their ability to experiment and adopt regenerative practices. Increased investment in research, education, and advisory services tailored to individual farms' contexts is essential to equip farmers with the necessary knowledge and skills and inform them about RA's benefits. The revealed farmers' perspectives from the interviews largely confirmed the existing literature. Contrasting findings were the effect of certification schemes and result-based policies, revealing the need for further investigation.

To my knowledge, this is the only study examining the CAPs role in supporting RA in Austria, and there is limited research on a European level. However, the small sample size of the interviewees in this study does not represent the experiences of all Austrian or European regenerative farmers. Generalizing from this study would undermine the diverse conditions of European agriculture and the increased flexibility of MS to develop national strategic plans, leading to significant differences in policy implementation. Therefore, given RA's increased popularity and promising benefits, further research should be conducted to create an incentivizing policy environment. Future research should include a larger, more diverse sample of farmers, incorporate quantitative methods to assess the extent to which CAP offers financial support for RA, address controversial points, and further investigate the complex interaction of policies and the uptake and facilitation of regenerative farming.

In conclusion, the evidence suggests that while CAP has made progress toward supporting RA, further reforms are necessary to realize its full potential in promoting regenerative farming in Austria. The potential of the CAP in this regard is significant, and policymakers can create a more enabling environment for RA to thrive by addressing the identified challenges and incorporating the suggested improvements.

APPENDIX

Interview Guide and Questions

Brief Introduction of the Farm and Your Role as a Consultant:

- What is regenerative agriculture? How do your practices differ from conventional/organic farms?
- What motivated you to change your methods?

Challenges:

- What challenges do regenerative farmers face?
- What hurdles and considerations are there when transitioning to regenerative agriculture?
- What are your insights from your role as a consultant?

Support from the CAP:

- Do you feel adequately supported by CAP subsidies with your methods?
 - Where are the deficits? Are there barriers for regenerative farmers within the current framework?
 - Which subsidies do you receive?
 - Are the subsidies you receive per hectare higher than those for a conventional farm? Are they sufficient to compensate for losses?
- What changes are needed to better support sustainable/regenerative farms, especially during the transition phase?
 - Are there enough incentives to encourage more farmers to transition?
 - How can more farmers be motivated to adopt regenerative agriculture?
 - What are your thoughts on the current education/training and advisory situation?
- Additional possible topics: Certification, consumer awareness, etc.

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