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POLICY IMPACT AND FACTORS OF FARMERS' PARTICIPATION IN AGRI-ENVIRONMENTAL MEASURES

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Abstract

Agricultural sector contributes to water, soil and air degradation, as well as biodiversity loss. Agri-environmental measures are a predominantly voluntary policy instrument that seeks to encourage farmers to implement environmentally friendly practices on their farms. This paper aims at providing an overview of policy drivers, goals and effects discussed in literature, as well as factors affecting farmers' decision to participate in AEM. Most studies geographically belong to Western Europe (United Kingdom, Germany, Sweden, Belgium, Denmark) and there is a disproportionately smaller amount of similar analyzes for Central and Eastern Europe. Connecting AEM's policy impact to understanding farmers' participation motives contributes to comprehending just how complex the concept of policy implementation is now and will be in the future. The effects of AEM mostly depend on the specific measure implemented, phenomenon investigated, and region observed. Farmer's interest to get involved in AEM depends on the potential economic benefit, socio-demographic factors, social connections, personal beliefs and trust in public institutions. Therefore, the policy should adapt to stakeholders' heterogeneity and send straightforward messages to farmers showing clear interrelation between the policy, farmers' uptake and the desired environmental outcome.

Key words**:** *agri-environmental measures, CAP, impact, farmers' participation, policy, review*

INTRODUCTION

Agricultural production is among economic activities which exploit significant amounts of natural resources, put pressure on the environment, lead to soil erosion, water scarcity and pollution, as well as contribute to the loss of wildlife habitat and biodiversity. Moreover, agriculture contributes to climate change through the release of greenhouse gases into the atmosphere, accounting for 10% of EU's overall GHG emissions [10]. Striking a balance between intensive production and the incorporation of environmental care is a challenge for modern agricultural production systems. Environmental targets have been increasingly present in the Common Agricultural Policy (CAP) since 1975, corresponding to EU's attempts of addressing the food surplus problem on the market and reducing the budget burden.

The specific relationship between agriculture and the environment is a stimulating one, with increasing public attention and demanding certain policy responses [24]. Policymakers are faced with difficult decisions; maintaining a resilient and competitive agricultural sector whilst safeguarding the natural capital on which it depends [7]. In order to prevent possible imbalances, agricultural policy provides measures and instruments with an increasingly influential role in making sustainable farming solutions. One such mechanism is the practice of agri-environmental measures (AEM), containing a wider range of practices to address general or specific environmental challenges.

Agri-environmental measures play an explicitly important role in meeting society's demands for environmental outcomes. They

can be designed at a national, regional or local level, allowing for an opportunity to adapt to specific agricultural systems and environmental conditions. In areas of intensive agricultural production, these measures are more focused on reducing environmental risks, such as planting winter cover or reducing fertilization. However, the measures can also be aimed at preserving natural and cultural landscapes, which is more conducive to extensive agricultural areas.

Agri-environmental measures are mostly a voluntary instrument, although in the latest 2014 CAP reform, certain management practices became obligatory for farmers in order to qualify for their basic subsidy. AEM seek to encourage farmers to improve and preserve the environment on their farms by implementing less intensive practices [2] and [28]. By implementing a certain measure, the beneficiary receives payments in accordance with incurred costs or lost income.

Several decades have passed since the introduction of first measures. CAP decision-makers began facing the problem of agriculture's negative impact on the environment in 1970s, after most agricultural products at EU level achieved self-sufficiency. Moreover, encouraging high-intensity production has led to overproduction and, due to the emergence of market surpluses, there has been a public debate about how much budget money is spent on surplus disposal and the consequences such production has on the environment. Concrete moves to reduce the budget burden have caused a change in aid structure and a potential decrease of farmers' incomes. These results are unacceptable since agricultural policy's most important goal is achieving a rational agricultural income. Being the most significant structural change of CAP measures in the 1970s, the sole introduction of support for Less-Favored Areas (LFA) in 1975 can be singled out as an example. The aim of this measure was to prevent land abandonment, preserve the landscape and retain the population. Agri-environmental measures have gained in importance with each subsequent reform. A number of policy changes introduced by the five CAP reforms in this period – the 1992 MacSharry, 1999 Agenda 2000, 2003 Fischler, 2008 Health Check and 2013 CAP reforms – may be considered 'environmental' in its nature in the sense that they either have environmental objectives, or could have positive environmental side effects [1] and [21]. The original purpose was to protect endangered habitats and landscapes, reduce the use of harmful agents and mineral fertilizers, so that over time the prevention of species loss would be in focus.

Farmers' environmental perceptions can play a significant part in the decision-making process [13]. They have to produce more food, adapt to climate change, whilst protecting and improving the environment in which they farm. Farmers are adapting their farming practices to conform to environmental needs and regulations [34]. What used to be a mostly productive activity became an activity with multiple goals, demanding a revision of farmers' behavior and taking land values and environmental protection into consideration [37] and [38]. There are different factors (variables) affecting farmers' decision-making process of voluntary participating in environmental schemes. Most research conclusions state financial and specific socio-demographic factors as important reasons to participate in AEM. Authors [22] have distinguished four categories of participation factors for the uptake of agri-environment schemes: farm factors, farmer factors, informational factors, and social factors. Furthermore, other authors [19] extracted five major categories: economic factors, farm structure, farmer characteristics, farmers' attitudes towards AEM and social capital. Social connectivity among farmers may also be a good driver for increasing farmers' willingness to participate in AEM [6]. Furthermore, farmers' attitudes and behavior towards the adoption of AEM are related to their beliefs [25]. Farmers also make decisions on their farming practice in social and cultural contexts [40]. The greater the credibility of public institutions, the more likely farmers are to participate in AEM [22] and [35].

Farmers are the main bearers in measures' implementation and their willingness to voluntarily take on additional engagement is essential for AEM to achieve environmental objectives. However, sustained participation is even more important, causing great concern to policymakers who are trying to achieve long-term consistency [38]. Hence, this review examines literature that encompasses both the policy impact (drivers, goals and effects) of agri-environmental measures and farmers' motives and drivers to participate in AEM.

MATERIALS AND METHODS

This is a narrative review based on a qualitative analysis, summarizing references selected from extensively reviewed bibliographic databases, such as ISI Web of Science Core Collection, ScienceDirect and Google Scholar, founded on the following sequence of keywords: *agri-environment(al) measures, schemes, Common Agricultural Policy (CAP), effect(s), policy impact, farmer(s), uptake, perception*.

There were more than 1,000 works in total, out of which 100 were scrutinized, but our analysis was focused on 44 studies.

Most literature sources geographically come from Western Europe (e.g., the United Kingdom, Germany, Sweden, Belgium, Denmark), which indicates an imbalance of empirical results and an absence or a significantly smaller number of similar analyzes for Central and Eastern Europe, with predominantly new Member States.

It is extremely important to connect AEM's policy impact to understanding farmers' participation motives in order to learn just how complex is the concept of policy implementation.

A detailed budget performance hasn't been included in this review since this paper's intention is to synthesize and compare the literature discussing policy measures and the willingness of farmers to uptake environment protection measures.

Other references which have also served to paint a picture about the decision-making process and implementation of AEM are not specified here due to the lack of space but are available upon request.

RESULTS AND DISCUSSIONS

Policy impact of agri-environmental measures

Agri-environmental measures have become an increasingly important CAP element since they occupy a significant portion of the budget allocated to rural development.

The CAP evolution is marked by the debate on how much policies contribute to biodiversity and landscape protection, reduction of an adverse environmental impact, as well as the kind of outcome produced by agri-environment measures. Major reforms in 1992 (by *set-aside*) and 2003 (by *cross-compliance*) endeavored to alleviate damage caused by agricultural intensification which has implied an increased application of chemical fertilizers and pesticides, utilization of seed varieties, combined with implementation of best management practices, mechanization, and irrigation [18]. The Agenda 2000 reform separated CAP into two pillars, extending the policy domain to rural development through which farmers could receive payments by voluntary engaging in an agri-environmental scheme. Although it is compulsory for Member States to design and implement AEM, the uptake of AEM by farmers is voluntary [9]. In the 2013 reform, in the CAP pillar one, green payments were introduced as a commitment for predominantly large farms, as well as measures to adapt or combat climate change. Green payments should, in addition to *cross-compliance*, further strengthen the link between direct payments and practices beneficial to the climate and the environment through the obligation to apply crop rotation, preserve permanent pastures and provide at least 5% of their land as seminatural habitats named ecological focus areas.

Pillar two of AEM contains voluntary commitments that cover organic farming, extensification of plant and livestock production, areas facing natural or other specific constraints, reduction of irrigation, crop rotation, action to conserve soil;

management of landscape, pastures and high nature value farmland (HNV); actions of promotion or conservation of biodiversity and genetic resources of local breeds [9].

Besides preventing environmental damage, AEM are needed to respond to increasing societal concerns related to the extent of agriculture's effects on the environment and how it affects the balance between economic, environmental and social needs [18]. As farming ensures the delivery of environmentally related public goods (landscape, environment, biodiversity, food security), farmers receive public subsidies. Moreover, the public-good status of the non-market agricultural outputs leads to market failure which makes it a political element and requires certain legislative framework to please society preferences.

Effects of AEM mostly depend on the specific measure implemented, phenomenon investigated, region observed and farmer's perception [12] and [39]. Aid is too often targeted at already protected areas (high value grasslands or Natura 2000), while it does not deliver significant positive effects to areas of intensive production. Aid targets individual farms instead of coordinated management to promote the expansion of spatial boundaries. Environmental protection cannot be viewed separately for each farm, as it is inherent in production and income policies, since biodiversity, ecosystem and climate change are much more complex goals and surpass the boundaries of one farm [20].

Given the huge expenditure (7% of CAP budget in the 2014-2020 period and more in the future on European AEM, it is important to analyze whether they improve socio-economic or environmental outcomes [19].

The evaluation of agri-environmental policy involves measuring environmental conditions on farms influenced by a particular policy implementation [29]. Studies considered in this review investigate mostly more developed, western regions of the EU and focus on the effects of AEM on biodiversity (farmland birds), followed by grassland vegetation and pollinators. Environmental outcomes of CAP from old Member States are often subject to discourse which calls for a transition towards a more sustainable EU food system [30]. CAP still has a mainly productivist rationale and agriculture is seen as a sector that contributes to an important policy goal: providing a sufficient supply of food [11].

Certain studies from new Member States (Hungary, Poland, Romania) mention benefits for their species richness, area protection in the environmental network Natura 2000 and a raising awareness among farmers as the number of beneficiaries fulfilling the agri-environmental commitments has increased, as well as extensive farming in HNV areas [4], [8], [17] and [23]. Still, a large proportion of small-scale farms, which prevail in CEE countries, are not eligible for AEM, or AEM does not fit to the local or regionally specific ecological and economic circumstances [33].

Farmers' participation in agri-environmental measures

Farmers' behavior plays a key role in the mechanism aimed at providing environmental services [9]. Farmers are adapting their farming practices behavior and attitudes according to the environment they manage. More and more, they conform to regulations required by AEM engagement [34], [38] and [42].

AEM contracts are voluntary-based contracts lasting minimally 5 years. Under these contracts, the farmer has to provide environmental goods that go beyond the minimum requirements of cross-compliance. During that period, they receive a fixed per-hectare payment to compensate for the additional costs and the loss of income linked to these commitments. By adopting certain practices that contribute to mitigating the adverse impact of agriculture on the environment and encourage biodiversity and conservation of genetic resources important for agriculture, increased costs or lost income are significant arguments to get public money compensation [30].

Farmers' willingness to voluntarily take on additional involvement in achieving environmental goals depends on many factors, such as the amount of support, the complexity of administration, the complexity of implementing the measure in practice, age,

education, business results of the farm, etc. Having trust in governmental institutions (local, regional, national), as well as perceiving the objectives of the EU and its legitimacy were found to be important factors in farmers' attitudes to greening measures [43].

Table 1. Discourse analysis of agri-environmental measures covering policy performance and farmers' preferences

Author(s)	Region/Country	Policy impact	Farmers' preferences
Alons, 2017 [1], **Erjavec and Erjavec, 2015** [11].	EU Member States	-incomplete transformation from an exceptionalist agriculture to a post-exceptionalist agriculture policy, -limited integration of environmental goals in agricultural policy -CAP reform decision-making process marked by a mostly productivist discourse	-farmers' economic interests go beyond environmental interests -productivist discourse favored by framers' organizations
Batary et al., 2015 [2], **Früh-Müller et al. 2019** [12].	EU Member States	-support is too often targeted at already protected areas or areas with extensive agriculture (high value grasslands or Natura 2000), while they do not bring significant positive effects to areas of intensive production -supported joint operations of farmers are more efficient	-scheme adoption is linked to utilitarian motivations, such as payment rate and ease of fit within the existing farm practice -those operating in areas with high environmental pressures are more reluctant to participate in schemes as they see a threat to their income
Brodzinska, 2014 [4], **Kubacka, 2016** [18], **Czyżewski et al., 2020,** [8].	Poland	-increase in the number of farms and areas under AEM -local authorities should be mobilized to take responsibility for AEM's implementation -agri-environmental measures generated positive spatial spillovers	-significant part of the AEM beneficiaries have purchased agricultural holdings in order to join the schemes, due to support benefits -experience and education enhance farmers' uptake
Hristov, 2020 [15], **Pe'er et al. 2017,** [28].	EU Member States Germany, Estonia, the Netherlands, Denmark, Austria, Czechia, England, Poland	-2013 CAP "greening" reform has little potential to improve biodiversity and ecosystem services on farms through AEM	-most AEM options that were considered beneficial to biodiversity (buffer stripes and fallow land) had low uptake among farmers perceived as not profitable to for the farm
Mihok et al., 2017, [23], **Toth et al. 2016,** [36].	Hungary	-joining the EU resulted in positive outcomes: the establishment of the Natura 2000, successful conservation of particular habitats and species -implementation of set-aside ensures a higher species richness	-traditional ecological knowledge can contribute to the knowledge-pool of ecosystems
Reif and Vermouzek, 2018 [31], **Suitcliffe et al., 2015,** [33], **Šumrada et al., 2021,** [32], **Guillem and Barnes, 2013** [13].	Slovenia, Czechia Scotland	-farmland birds significantly declined after EU accession -intensification of production, particularly in the beef and dairy sectors are key drivers of the farmland biodiversity loss in Slovenia -majority of AEM have focused on managing water and soil quality, while ecological benefits lag behind	-farmers increased their intensification of production after EU accession due to economic preference of higher CAP direct support -schemes fail to encourage farmers with strong ecologically related attitudes, but also those with production objectives -lack of knowledge on bird habitat requirements limit the uptake
Braito et al., 2020 [3], **Brown et al., 2021** [5], **Coyne et. al., 2021** [7], **Mozzato et al., 2018,** [25].	Austria, Czechia, Finland, Germany, Greece, Hungary, Spain, Sweden and England	-monetary incentives may not be enough to promote sustainable soil management practices -CAP reforms have failed to effectively utilize extensive scientific knowledge about socio-ecological interactions at farm level at the expense of environmental benefits	-plurality of socio-demographic, geographical, informational and farm characteristic factors affecting farmers' decision for uptake makes the policy decision-making process more complex -flexibility, simplicity and compatibility with the farm type and operations are key factors prompting dairy farmers to engage
Hyland et al., 2016 [16], **Pagliacci et al., 2020,** [27], **Van Herzele et al. 2013** [41].	Wales Italy Belgium	-current system of measure targeting is not sufficient to stimulate voluntary involvement in climate change related practices	-difference among early and late adopters -four types of farmers: The Environmentalist with high awareness and The Dejected with the risk perception are most likely to implement measures sooner, still, the lack of knowledge could be an obstacle. The Countryside Steward wants to act pro-environmentally but is lacking in the awareness of climate change. The Productivist is less likely to adopt climate related measures due to self-identity of producing more. -in Belgium, six modes or styles of participation were identified: opportunistic (already implementing practices, money is a bonus, calculating (money is the only motive) compensatory (for a small amount of extra effort they can receive a larger amount), optimizing (report measures for areas where they cannot have a greater economic impact than what has already been achieved), catalyzing (want to achieve a quick positive impact) and engaged (stress the societal value of AEM)

Source: Authors' elaboration based on utilized references.

Farmers are often motivated by both environmental benefit and profit and are unwilling to implement measures that they see as ineffective. Higher levels of education, flexibility in the AEM contract, social connections (unions, organizations) and social capital (advisory service) increase the uptake of agri-environmental and recently introduced climate measures.

In many cases AEM tend to limit agricultural production. This observation strengthens the contradiction between economic goals and environmental goals and limits farmers' motivation to get involved [44]. The most production-oriented farmers are more likely to avoid participation in additional environmentally friendly practices.

Heterogeneity among farms (livestock and crop producers, small-scale and large-scale), different EU countries and distinct views regarding the means of reform discussed in literature [14] and [26] call for differentiation and a wide range of measure adaptation in policy design (e.g., result-based, region-based).

Several studies group farmers in different types, according to reasons for their participation in AEM or by different motives, distinguishing between early or late adopters in order to highlight the importance of adapting the policy measure accordingly.

An additional issue for farmers and policy makers are climate change-related actions.

Although farmers' businesses are directly exposed to climate change, the decision to change their farming practices is still far from obvious [27]. There is still a lack of awareness about climate-related problems as they still haven't fully influenced production and costs. Farmers' personal experience is still rather rare as extreme weather disasters do not occur often enough to alter their actions. This lowers their willingness to implement practices that address climate change. Farmers are more likely to actively react when they are aware of an environmental problem and consider the environmental threat to be real [16].

Policy effects and driving factors of farmers' involvement are the most researched topics in the context of AEM's success. Usually, studies analyze one of mentioned subjects more deeply, however, the two have been connected in our review, which also grouped studies by common elements in policy impact and farmers' preferences (Table 1).

CONCLUSIONS

This paper aims at providing a narrative review of academic literature that thematizes drivers, goals and effects of agricultural policy, as well as motives of farmers' participation in the domain of AEM. Overall, 44 papers providing policy impact and factors determining the farmers' participation have been analyzed. Such studies have been carried out in many Western Europe countries (mostly old Member States) but to a lesser extent in Central and Eastern Europe. The results have often shown that the policy impact and farmers' rationale are locally determined. Furthermore, despite the constant reform process, efforts to improve environmental impact and farmers attitude.

Often measures are compromised by CAP's productivist elements and farmers' productivist attitudes.

On the other side, measures often target already protected areas or areas with extensive agriculture, while areas of intensive production and high environmental pressure can make use of less support. Agricultural policy has a limited positive impact on biodiversity, when implemented in individual areas and paid per farm, while supporting joint operations of farmers is more efficient.

For new Member States, EU membership has resulted in the establishment of the Natura 2000 network and appropriate institutions, as well as in the strengthening of scientific research dealing with agri-environmental relationship. It has also provided access to environmental protection funds, all of which have contributed to the restoration of habitats in general and some restoration of significantly endangered species of plants and animals.

Farmers' behavior, beliefs and values and socio-economic background make monolith policy measures inefficient. Therefore, the policy should adapt to stakeholders'

heterogeneity by being more flexible and less bureaucratic. The policy should also become trustworthy and send straightforward messages to farmers, showing clear interrelation between the policy, farmers' uptake and the desired environmental outcome.

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