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COMPARATIVE ANALYSIS OF THE ADVANTAGES AND LIMITATIONS OF ACTION-BASED AND PERFORMANCE-BASED AGRI-ENVIRONMENT SCHEMES

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Abstract
The majority of agri-environment payments (AEPs) in the European Union (EU) are action-based payment schemes that impose specific agricultural management requirements on farmers. These schemes offer clear and specific instructions for farmers, making them easier to understand and implement. They also provide stable and predictable income which helps farmers with handling the financial risks. However, they do not always deliver the desired environmental outcomes and their effectiveness in protecting biodiversity is limited. This paper outlines some of the limitations of the action-based ecological schemes including their lack of flexibility when it comes to addressing the specific needs and conditions of the farmland and their economic inefficiency as in some cases resources are being spend on actions that do not always lead to significant environmental benefits. To increase their effectiveness, it may be useful to integrate result-based schemes that link payments to specific ecological results. Result-based ecological schemes give freedom to farmers to adapt their farming practices to the specific conditions of their land. They provide financial incentives for farmers to achieve measurable environmental benefits such as improved biodiversity, water quality, soil health and other ecosystem services. Existing result-based payments are mainly aimed at maintaining threatened habitats or priority species for conservation. This type of payments give freedom to farmers to adapt their farming practices to the specific conditions of their land. In general, result-based agri-environmental schemes are successful when the cause-effect relationships between farming practices and environmental objectives are well established and can be represented by single or combined indicators. Despite the distinct advantages, results-based schemes face certain challenges – not all biodiversity targets can be measured by indicators; isolation and fragmentation of species and habitats; increased economic risk for farmers; need for appropriate advisory support. To overcome the specific limitations of the two types of environmental schemes, it would be useful to consider a hybrid approach that combines payments for actions and payments for results. The current report provides examples for the implementation of result-based schemes in Germany, Switzerland and Ireland. These countries were selected as they have one of the longest running and best designed result-based payment schemes in Europe. They can be used as a basis for the further development and application of result-based schemes. The aim of this report is to discuss the advantages and limitations of action-based and result-based agri-environment schemes. A comparative analysis of the two types of agri-environmental schemes was carried out based on the existing scientific literature.
Key words: Agri-environment schemes; Agri-environment payments; Result-based schemes; Action-based schemes; Biodiversity
JEL codes: Q14, Q18, Q20

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Introduction

The agricultural sector plays a key role in the development of the world economy. It is a sector that the world's population depends on to provide for its food supply and can be expected to become increasingly important in the future as demands on food quality and production methods increase. Agriculture depends on a well-functioning environment, but is also responsible for some harmful effects on it (Bartkowski et al., 2021). On the one hand, farmers are strongly affected by environmental changes, such as climate change and the deterioration of arable land quality (Jägermeyr et al., 2021; Bartkowski et al., 2021). On the other hand, agriculture has significant impacts on soils, water quality, air and biodiversity (Yordanova and Garkova, 2019). One way to address the problems associated with environmental degradation and biodiversity loss is to implement agri-environment schemes, which provide payments to farmers for changing existing or adopting new agricultural practices to achieve environmental benefits.

The agri-environment schemes implemented under the Common Agricultural Policy (CAP) provide the policy framework for sustainable agriculture in Europe and represent the largest source of funding for effective nature conservation in the European Union (EU). There are two main types of agri-environment payments (AEPs) – action-based and result-based schemes. The majority of AEPs in the EU are action-based payment schemes (Bartkowski et al., 2021), which impose specific requirements on farmers for agricultural management. These schemes vary considerably from country to country and cover different objectives, such as maintaining species-rich grassland (high nature value lands), maintaining hay meadows under certain mowing regimes, or reducing the use of agrochemicals. On arable land, it usually involves the implementation of measures such as field boundaries, planting and maintaining hedges, putting up bird houses, etc.

The aim of this report is to discuss the advantages and limitations of action-based and result-based agri-environment schemes.

The methodological approach applied is a comparative analysis of the two types of agri-environmental schemes implemented in Europe. It is based on a literature review of scientific publications focused on agri-environment schemes.

Advantages and limitations of action-based agri-environment schemes

Agri-environment schemes were established in 1985 as a way of compensating farmers for income they lost when implementing less intensive and more environmentally friendly agricultural management practices. In 1992, the AES as a financial instrument of the CAP became mandatory for all EU Member States, with each country developing its own programme. Farmer participation remains voluntary, although following the CAP reform in 2014, some practices became mandatory for farmers seeking to receive a basic subsidy (Lécuyer et al., 2021). These schemes can be applied both horizontally (across the whole country), e.g. supporting organic farming, and zonally, within areas of high natural value (Lécuyer et al., 2021; Batáry et al., 2015). These

include both cultivated land and uncultivated areas, such as wildflower strips (Lécuyer et al., 2021). One of the main criticisms of traditional, action-based AESs is that their success is measured by the level of farmer participation rather than the achievement of actual environmental improvements (Lécuyer et al., 2021; Herzon et al., 2018).
A review of monitoring data on action-based agri-environment schemes shows that they do not provide the expected biodiversity benefits (Elmiger et al., 2023). One of the reasons for their limited effectiveness according to Elmiger et al. (2023) is that they do not take sufficient account of local environmental features. Other reasons are due to the lack of flexible payment conditions, which prevents farmers from adapting the measures to the specific conditions of their farms (Bredemeier et al., 2022), and the inability to inspire long-term behavioural change in participating farmers (Batáry et al., 2015).
Various research studies (Batáry et al., 2015; Burton & Schwarz, 2013) highlight some key advantages and limitations of action-based agri-environment schemes.

Advantages

1. Clarity: action-based schemes offer clear and specific instructions for farmers, making them easier to understand and implement (Burton & Schwarz, 2013). Farmers are more likely to comply when they know exactly what is expected of them, leading to higher levels of participation (Primdahl et al., 2010).
2. Predictable and stable income: these schemes provide stable and predictable income for farmers, as payments are linked to the performance of specific actions rather than outcomes, which may be subject to external factors (Engel, 2016). This stability helps to reduce financial risks for farmers, which encourages wider adoption of sustainable practices (Meyer et al., 2015).
3. Promote specific practices: action-based schemes promote specific, ecologically beneficial practices such as planting hedgerows, creating buffer zones and reducing chemical inputs, which can lead to gradual ecological improvements (Kleijn et al., 2006).
4. Standardization: By prescribing specific actions, these schemes help standardize certain agroecological practices across regions (Whittingham, 2007).

Limitations

1. Lack of focus on ecological outcomes: action-based rather than results-based payments do not ensure that desired ecological outcomes are achieved because they do not focus on measurable improvements in biodiversity or ecosystem services (Kleijn et al., 2019; Whittingham, 2011).
2. Poor targeting: action-based AES are often applied the same across different regions. As a result, resources may be allocated to places where they are less needed or are less effective. Therefore, they may fail to address specific local

environmental challenges, thus weakening the overall impact of the scheme (Batáry et al., 2015).
3. Lack of flexibility: action-based schemes may be too restrictive, not allowing farmers to adapt their actions to the specific needs and conditions of their land, which may reduce the effectiveness of the measures (Bazzan et al., 2022; Burton & Schwarz, 2013). Lack of flexibility may hinder innovation as farmers are less willing to experiment with new practices that might be more effective in specific contexts (Herzon et al., 2018).
4. Economic inefficiency: as payments are not linked to actual environmental outcomes, there is a risk that resources will be spent on actions that do not lead to significant environmental benefits, raising questions about the cost-effectiveness of these schemes (Batáry et al., 2015).
5. Evaluation problems: it is difficult to evaluate the effectiveness of these schemes when the main measure is the performance of actions rather than the ecological effect (Uthes & Matzdorf, 2013).
6. Administrative burden: Monitoring and verifying the implementation of prescribed actions can require significant administrative resources, increasing the overall costs of schemes (Lankoski, 2016). The implementation of action-based schemes often involves complex bureaucratic processes, which can hinder farmer participation and complicate scheme implementation (Primdahl et al., 2010).

Action-based AESs have some significant advantages such as clarity, predictable incentives and the promotion of standardised sustainable practices. However, one of the significant criticisms of these types of schemes is that they fail to influence farmers' attitudes towards the environment or change their behaviour and are therefore ineffective in the long term (O'Rourke, 2020). Their focus remains limited in terms of tangible measurable outcomes, adaptation of practices to address farmers' specific needs, economic and environmental efficiency. Integrating results-based schemes that link payments to specific environmental outcomes could be beneficial for overcoming some of the limitations that action-based schemes pose.

Advantages and limitations of result-based agri-environment schemes

Agri-environment payments for results are mechanisms for rewarding farmers on the basis of environmental results achieved, rather than on the performance of predetermined actions. Although there is no single accepted definition of what constitutes an agri-environmental result-based payment scheme, there are several key definitions and concepts used to describe these schemes in the scientific literature. According to the Organization for Economic Co-operation and Development (OECD), agri-environmental result-based payments are payments that are linked to observable and measurable environmental outcomes related to specific objectives such as improved biodiversity, water quality, soil condition and other ecosystem services

(OECD, 2010). The European Commission defines agri-environment outcome payments as financial incentives provided to farmers for achieving specific environmental results rather than for implementing specific practices or actions (EC, 2018). Kleijn et al. (2006) propose a definition that focuses on the measurement and specificity of the outcomes. They describe payment for results as financial compensation provided for the achievement of clearly defined and measurable environmental and sustainable agriculture objectives. According to other authors (Hanley et al., 2012), payment for results are schemes in which farmers are rewarded based on measurable environmental outcomes, providing a direct link between farmers' efforts and the environmental benefits received. This approach assumes that farmers have the freedom to choose how best to achieve these outcomes.

Advantages

1. Flexibility and innovation. One of the main advantages of result-based schemes is that they encourage innovation by allowing farmers to choose how to achieve environmental objectives, rather than limiting them to specific actions. This flexibility can lead to more effective and context-specific solutions. Fewer restrictions and regulations make result-based payments more attractive to farmers (Elmiger et al., 2023).
2. Measurable results: Establishing specific, measurable, achievable, realistic and time-bound (SMART) goals help guide farmers' activities (Lankoski, 2016). Results-based AES help to build a direct link between payments and achieved environmental outcomes, such as biodiversity conservation and improvement, water and soil quality, or carbon sequestration (Kleijn et al., 2006; Burton & Schwarz, 2013). According to Batáry et al. (2015), result-oriented AEPs can have a better effect on biodiversity than traditional AESs because they reward actual conservation outcomes rather than compliance with management prescriptions. This focus on tangible outcomes makes schemes more effective in achieving environmental goals compared to action-based schemes (Herzon et al., 2018).
3. Cost-effectiveness: payments for environmental performance have the potential to optimise costs, as funds are only spent when real environmental benefits are achieved.
4. Adaptability to local contexts: result-based payments give farmers autonomy and freedom to use their existing knowledge about the specific context of farming systems (O'Rourke, 2020). This makes the approach more adaptable to different local conditions and regional characteristics.

Limitations

1. Difficulties in measuring results: one of the most serious challenges for results-based AES is developing reliable indicators that accurately reflect environmental improvements (Herzon et al., 2018). These types of schemes are limited to cases where causal links between agricultural practices and environmental objectives are well established and can be represented by single or combined indicators.

Some agro-ecological interactions are very complex, operate at specific spatial and time-scales, can vary even within small spaces and short distances, and not all biodiversity objectives can be measured by indicators (O'Rourke, 2020). Changes in habitats may respond slowly to changes in land management practices due to the slow-down of ecosystem processes and may not be captured by indicators for a long time. The time lag between management inputs and ecosystem management outcomes may also complicate monitoring and payment, and this would make these types of schemes less attractive to farmers (O'Rourke, 2020).

2. Increased risk and uncertainty: result-oriented agri-environment schemes are associated with increased risk for farmers, as the outcome of land management practices may depend on factors beyond their control: farmers' behaviour on neighbouring land; natural processes – weather conditions, pest infestation, diseases, parasites; different life cycle stages of migratory species may occur in different geographical locations. While action-oriented AEPs can provide a reliable source of funding (with risks transferred to the state), outcome schemes do not offer such certainty. This requires effective risk management to be considered in the design of results-based AE programmes.
3. High transaction and monitoring costs: the implementation of AES for outcome is often associated with significant transaction and monitoring costs due to the need for reliable systems to verify outcomes. Therefore, such schemes are only implemented in settings where monitoring costs are reasonably low (Bartkowski et al., 2021).

By their very nature and compared to payments for actions, AEPs for results represent an innovative approach in agri-environment policy. This method aims to improve the efficiency and sustainability of farming practices by providing financial incentives for farmers to achieve measurable environmental benefits such as improved biodiversity, water quality, soil health and other ecosystem services. Most result-based measures implemented to date target species-rich grasslands and aim to conserve plant rather than animal species; in part because mobile animals are more difficult to monitor and are dependent on conditions in adjacent fields, and in the case of migratory birds, on differing conditions across countries and continents (O'Rourke & Finn, 2020). Existing result-based AEPs are mainly aimed at maintaining threatened habitats or priority species for conservation. This makes them more suited to maintaining existing habitats (where farmers can use their management expertise) rather than restoring or re-creating habitats (O'Rourke & Finn, 2020). Typically, these are semi-natural habitats, High Nature Value (HNV) land, where low-cost farming practices have been applied for a long time, with Natura 2000 sites being the highest priority.

Examples of agri-environment schemes for results from European countries

The first result-based agri-environmental scheme projects were implemented in the early 2000s, with one of the longest running and best-known schemes being the

MEKA programme ('Extensive Grassland Management'), introduced in 2000 and co-funded by the CAP, focusing on species-rich grasslands in Baden-Württemberg and later in Lower Saxony in Germany. Under this scheme, farmers received payments if their meadows contained four of a list of 28 indicator plant species. In the periods 2000 – 2009 and 2009 – 2014, the scheme was hybrid and farmers received outcome payments in addition to payments for extensive grassland management actions. In the 2014 – 2020 programming period, a two-tier 'stand-alone' payment has been introduced, amounting to €230/ha for four indicator species and €260/ha for six indicator species, and the result-based measure could not be combined with other action-based measures, as it was before 2014. Over 9000 farmers participated in the programme covering an area of 66 112 ha.

Other examples of earlier results-oriented schemes are the Swiss biodiversity conservation programme Proof of Ecological Performance (PEP) and the Irish Burren programme.

PEP started in Switzerland in 1998 and continues to operate to this day. To qualify for direct payments, farmers must comply with a set of environmental and animal welfare standards. One of the requirements for farmers is to grow specific crops (vines, fruit and vegetables) on at least 3.5% of the utilised agricultural area (UAA) of the farm. Farmers receive additional payments for so-called Ecological Focus Areas (EFA) provided they apply farming practices to protect biodiversity (balanced use of fertilisers, regulated crop rotations, appropriate soil protection, targeted use of plant protection products) on at least 7% of the UAA. Ecological target areas include grasslands, pastures, orchards, wildflower strips, etc. (Jan et al., 2024). In 2020, the share of ecological target areas that are part of the management-based payment scheme amounts to 19% of total UAA. On average, farmers received payments for achieved results for 43.3% of these areas (excluding trees). (Jan et al., 2024).

One of the best designed and longest running AES for results is the Burren programme, which started in Ireland in 2005 with twenty pilot farms covering 2500 ha of priority habitats. In present days there are 328 participating farms covering an area of 23,000 ha. Over the last 10 years the programme has actively worked to protect and enhance cultural heritage and landscapes; sustainably managing high nature value farmland; and improving water quality and efficient water use in the Burren region. The programme has initiated a 5-year applied research project called 'Burren LIFE' which is developing a plan for sustainable agriculture in the region. The Burren programme applies a “hybrid” approach, using two key interventions: Intervention 1 (I-1) is direct payments for achieved environmental results and Intervention 2 (I-2) to receive additional support by implementing activities (up to 5 activities within the contract and the allocated budget) to protect the environment. The Burren programme does not take a holistic approach to farming: currently only species-rich areas are targeted, although Intervention 2 activities can also be carried out in species-poor areas to ensure better management of the targeted areas. The

success of the Burren program is due to its tailor-made approach to local needs and specificities, the leading role of farmers, the innovative payment system and the strong spirit of partnership between stakeholders.
Result-based agri-environmental payments are widely regarded as the future direction for the European agriculture however there are certain obstacles that they are faced with. On one hand result-based schemes require advanced monitoring and measurement of the desired outcomes. On the other hand, there is uncertainty of payment due to some external environmental factors that are beyond farmers' control. This kind of risk associated with result-based payments make them less appealing to farmers compared to action-based payments. (Bartkowski et al., 2021). A hybrid approach involving direct payments for management activities in addition to payments for results, as applied in the Burren programme and the Extensive Grassland Management programme in Baden-Württemberg, could be used as a means to reduce risks.

Conclusion

Agri-environment schemes are an important tool for achieving sustainable agriculture and are a major source of funding for nature conservation in Europe. The AES vary considerably from country to country in Europe. The objectives of these programmes and the choice of instruments usually reflect the characteristics of nature, the environmental and socio-economic problems associated with agriculture, and the political situation in each country. Understanding farmers' attitudes towards land use is a prerequisite for developing effective policies and programmes aimed at conserving and improving agricultural biodiversity. There is significant potential for expanding the implementation of results-based AES within the CAP. The examples of successful and long-term adoption of this type of schemes in different European countries provide a promising basis for their further application, as long as they are adapted to the local conditions and characteristics of farming systems; consider the economic risks for farmers and promote innovation. Payment-for-results schemes depend on setting clear targets linked to farming practices that can be measured by reliable indicators that are not directly dependent on external factors. Where this is not possible, a hybrid approach may be considered, complementing existing action-based schemes with result-based schemes. The integration of different approaches can help to improve the effectiveness of agri-environment schemes and achieve better outcomes for nature and farming communities.

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References

Bartkowski, B., Droste, N., Ließ, M., Sidemo-Holm, W., Weller, U., Brady, M. V. (2021). Payments by modelled results: a novel design for agri-environmental schemes. Land Use Policy 102: 105230.

Batáry, P., Dicks, L. V., Kleijn, D., & Sutherland, W. J. (2015). The role of agri-environment schemes in conservation and environmental management. Conservation Biology, 29(4), 1006 – 1016.

Bazzan, G., Daugbjerg, C., Tosun, J. (2022). Attaining policy integration through the integration of new policy instruments: The case of the Farm to Fork Strategy. Applied Economic Perspectives and Policy 45(2), 803-818

Bredemeier, B., Herrmann, S., Sattler, C., Prager, K., G. J. van Bussel, L., Rex, J. (2022). Insights into innovative contract design to improve the integration of biodiversity and ecosystem services in agricultural management. Ecosystem Services. 55: 101430.

Burton, R. J. F., & Schwarz, G. (2013). Result-oriented agri-environmental schemes in Europe and their potential for promoting behavioral change. Land Use Policy, 30(1), 628 – 641.

Elmiger, N., Finger, R., Ghazoul, J., Schaub, S. (2023). Biodiversity indicators for result-based agri-environmental schemes – current state and future prospects. Agricultural Systems. 204: 103538

Engel, S. (2016). The devil in the detail: A practical guide on designing payments for environmental services. International Review of Environmental and Resource Economics, 9(1 – 2), 131 – 177.

Hanley, N., Banerjee, S., Lennox, G. D., & Armsworth, P. R. (2012). How should we incentivize private landowners to 'produce' more biodiversity? Oxford Review of Economic Policy, 28(1), 93 – 113.

Herzon, I., Birge, T., Allen, B., Povellato, A., Vanni, F., Hart, K., & Radley, G. (2018). Time to look for evidence: Results-based approach to biodiversity conservation on farmland in Europe. Land Use Policy, 71, 347 – 354.

Jan, P., Zimmert, F., Dux, D., Blaser, S., Gilgen, A. (2024). Agricultural production and biodiversity conservation: A typology of Swiss farmers' land use patterns. Environmental and Sustainability Indicators, 22: 100388.

Jägermeyr, J., Müller, Ch., Ruane, A. C., Elliott, J., Balkovic, J., Castillo, O., Faye, B., Foster, I., Christian Folberth, Ch., et al. (2021) Climate impacts on global agriculture emerge earlier in new generation of climate and crop models. Nature Food. 2, 873 – 885

Jordanova,F. & Strekalovska-Garkova, A. (2019). Analysis of challenges and factors for sustainable development of the agriculture in Bulgaria and EU (Анализ на предизвикателствата и факторите за устойчиво развитие в аграрния сектор в България и ЕС). Management and Sustainable Development 5(78).

Kleijn, D., Bommarco, R., Fijen, T. P.M., Garibaldi, L. A., Potts, S. G., van der Putten, W. H. (2019). Ecological Intensification: Bridging the Gap between Science and Practice. Trends in Ecology and Evolution 34(2), 154 – 166, 2021.

Kleijn, D., Berendse, F., Smit, R., Gilissen, N., Smit, J., Brak, B., & Groeneveld, R. (2006). The conservation effects of meadow bird agreements on farmland in the Netherlands. Biological Conservation, 126(3), 372 – 382.

Kleijn, D., Rundlof, M., Scheper, J., Smith, HG., Tscharntke, T. (2011) Does conservation on farmland contribute to halting the biodiversity decline? Trends in Ecology and Evolution 26(9), 474 – 481.

Lankoski, J. (2016). Alternative payment approaches for biodiversity conservation in agriculture. Ecological Economics, 120, 299 – 310.

Lécuyer, L., Alard, D., Calla, S., Coolsaet, B., Fickel, T., Heinsoo, K., Henle, K., Herzon, I., Hodgson, I., Quétier, F., McCracken, D., McMahon, B. J., Melts, I., Sands, D., Skrimizea, E., Watt, A., White, R., Young, J. (2021). The Future of Agricultural Landscapes, Part III. Advances in Ecological Research. 65, 2 – 430

Meyer, C., Priess, J. A., & Schaldach, R. (2015). Projecting land-use change in the northern Upper Rhine region: Lessons from integrating participatory and scenario modelling approaches. Land Use Policy, 46, 197 – 213.

Moxey, A. and White, B. (2014) Result-oriented agri-environmental schemes in Europe: A comment. Land Use Policy 39, 397 – 399.

O'Rourke, E. & Finn, J. A. (2020). Farming for Nature: The Role of Results-Based Payments. Teagasc and National Parks and Wildlife Service (NPWS).

Primdahl, J., Peco, B., Schramek, J., Andersen, E., & Onate, J. J. (2010). Environmental effects of agri-environment schemes in Europe – Does the delivery match the expectations? Journal of Environmental Management, 91(5), 1295 – 1302.

Uthes, S., & Matzdorf, B. (2013). Studies on agri-environmental measures: A survey of the literature. Environmental Management, 51(1), 251 – 266.

Whittingham, M. J. (2007). Will agri-environment schemes deliver substantial biodiversity gain, and if not why not? Journal of Applied Ecology, 44(1), 1 – 5.

Whittingham, M. J. (2011). The future of agri-environment schemes: biodiversity gains and ecosystem service delivery? Journal of Applied Ecology, 48(3).

Wunder, S., Engel, S., & Pagiola, S. (2008). Taking stock: A comparative analysis of payments for environmental services programs in developed and developing countries. Ecological Economics, 65(4), 834 – 852.

OECD (2010). Guidelines for Cost-effective Agri-environmental Policy Measures. OECD Publishing.

European Commission (EC) (2018). Evaluation study of the payment for agricultural practices beneficial for the climate and the environment.

Result based payments network (https://www.rbpnetwork.eu/)