



BESTMAP

BEHAVIOURAL, ECOLOGICAL & SOCIO-ECONOMIC
TOOLS FOR MODELLING AGRICULTURAL POLICY

Policy notes

Deliverable D6.7

30th June 2023

Gabriele Sacchettini¹, Michael Beckmann², Anne Paulus², Anna Cord³,
Stephanie Roilo³, Rosemary Wool⁴, Guy Ziv⁴, Arjan Gosal⁴, Jodi Gunning⁴,
Tomáš Václavík⁵, Cristina Domingo⁶, Sanja Brdar⁷, Sonja Trifunov⁷, Gabriela Popova⁸

The Rural Investment Support for Europe Foundation¹

Helmholtz Centre for Environmental Research - UFZ²

Technische Universität Dresden³

University of Leeds⁴

Palacký University Olomouc⁵

Centre for Ecology Research & Forestry Applications⁶

BioSense Institute⁷

Pensoft Publishers⁸

BESTMAP

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Behavioural, Ecological and Socio-economic Tools for Modelling Agricultural Policy



Subject to change

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School of Geography,
University of Leeds, UK
<http://bestmap.eu/>

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Preface

One of the main objectives of WP6 (Capacity Building & Dissemination) is to increase public awareness of the project's findings, recommendations, and achievements among key stakeholder groups.

Activity 6.3.3 (Policy notes) aims to develop policy notes based on the project's outcomes and recommendations. These policy notes aim to inform policymakers about the potential of the approach proposed by BESTMAP. The primary goal is to empower EU and regional policymakers to gain a better understanding of the resources and long-term drivers of rural territories and land use, as well as how they are influenced by current and future policies. This understanding will enable policymakers to make more informed decisions.

What is a policy note and why do we need them?

A policy note, also known as a policy brief, is a valuable tool for presenting a set of recommendations based on scientific research to a non-specialized audience. These concise documents address pressing issues and provide evidence-based policy advice for decision-makers. The purpose of a policy note is to use clear language and comprehensible terms to showcase research findings and establish connections to potential policy initiatives through a list of recommendations. Policy notes should be concise, easy to read, and capable of standing alone while focusing on a specific issue.

Policy notes concerning environmental matters stem from contemporary research and are often produced within the context of large-scale projects. The recommendations within a policy note are based on scientific papers published in academic journals and project results in general. These notes propose courses of action to address existing environmental problems or to enhance relevant international, national, or local policies and legislation. Their target audience includes policy and decision-makers at global, European, regional, national, or local levels.

To ensure the success of policies and the resolution of existing issues, they must be presented to policymakers in a manner that is easily understood. Scientific policy notes, in particular, need to be based on state-of-the-art research findings, which often employ specialised jargon and concepts that can be challenging for non-specialized readers to grasp. Therefore, a policy note employs clear language and comprehensible terms to express complex ideas. The objective is to synthesise a set of policy recommendations that can contribute to an improved legislative landscape. A well-written policy note effectively communicates the urgency of an issue and highlights the benefits of adopting the recommended policy actions. Policy notes serve as a crucial stepping stone in developing innovative and constructive policies for the betterment of the environment and society as a whole.

Summary

Activity 6.3.3, Policy Notes, aims to develop policy documents based on project outcomes and recommendations. These notes inform policymakers about BESTMAP's proposed approach, empowering them to understand rural resources, land use, and policy impacts. Seven policy notes were developed, including proposals for the new EU statistical regulation and the Common Agricultural Policy, as well as case-specific scenarios.

While the first note was developed as feedback for the roadmap proposed by the European Commission Initiative, the others were created using a professional template to ensure high quality, consistency across the series, and compliance with accessibility requirements.

The notes were finalised in June 2023, and online meetings in September 2023 will focus on dissemination strategies using completed working documents.

1. Policy note to propose changes to the new Integrated Farm Statistics (EU Regulation 2023/1091)

BESTMAP project investigated how the implementation of the new Integrated Farm Statistics regulation and data policies, particularly regarding geolocation and cross-referencing production surveys and socio-economic surveys with other data sources, could potentially reduce or eliminate the need for collecting empirical behavioural data in each Case Study (CS).

In the Farm to Fork strategy (F2F), the Commission expressed its intention to transform the Farm Accountancy Data Network (FADN) into a Farm Sustainability Data Network (FSDN). This transformation aims to collect farm-level data aligned with the new objectives outlined in the Green Deal, F2F, and Biodiversity strategies. The proposed regulation seeks to expand the current network's scope, which currently collects data on EU farms, to also include data on environmental and social farming practices. The purpose of this new data collection is to assess farm performance, provide tailored advice and guidance to farmers, and ultimately enhance the sustainability of farming practices, including farm incomes.

A series of consultation activities took place in the process of preparing a proposal for the conversion into the FSDN.^[1] On 4 June 2021 the FSDN Roadmap (Ref. Ares(2021)3651157 - 03/06/2021) was published, outlining the main objectives of the future FSDN proposal and providing a four-week feedback period. In order to actively participate and contribute to the Commission's work from the early stages, BESTMAP decided to engage in this consultation process. To fulfil this purpose, a Policy note was developed in the form of "Feedback" to the Roadmap proposed by the European Commission Initiative on conversion to a FSDN.

1.1 Method

The contribution (corresponding to the actual policy note) was submitted on the 30th June 2021 by the project Coordinator on behalf of the entire Consortium.

1.2 Results

Contents of the policy note are included in Box 1. On-line version is available on https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12661-Conversion-to-a-Farm-Sustainability-Data-Network-FSDN-/F2660530_en

To maximise the impact, the key recommendations of the policy note were disseminated through participation in the following events, to which BESTMAP was invited:

- DG AGRI & Agrimodels Cluster Workshop (May 23, 2022, Brussels): During this workshop, BESTMAP collaborated with the Agrimodels cluster, which includes sister projects MIND STEP and Agricore. The workshop provided an opportunity for BESTMAP to update DG AGRI on project activities and share experiences related to dealing with the FADN. Dedicated presentations and discussions were conducted. Representatives from the University of Leeds, CREAM, and UPOLE participated on behalf of the BESTMAP consortium.
- Conversion of Farm Accounting Data Network into the Farm Sustainability Data Network, 3rd Stakeholder Workshop (November 22, 2022, online): The workshop brought together a network of specialists involved in the current FADN system in Member States, as well as representatives from European Commission services, advisors, researchers, evaluators, private companies, and specialists from third countries and international organisations. The BESTMAP consortium was represented by the project coordinator.

By participating in these events, BESTMAP aimed to effectively disseminate the recommendations from the policy note and engage with relevant stakeholders in the field.

Figure 1: Feedback on Roadmap in the frame of EC initiative Conversion to a Farm Sustainability Data Network (FSDN)

Feedback reference F2660530

Submitted on 30 June 2021

Submitted by Jodi Gunning

User type Academic/research Institution

Organisation University of Leeds

Organisation size Large (250 or more)

Country of origin United Kingdom

Initiative Conversion to a Farm Sustainability Data Network (FSDN)

H2020 project BESTMAP (Behavioural, Ecological and Socio-Economic Tools for Modelling Agriculture Policy, grant agreement No 817501) is developing a new framework integrating farmers' behaviour and biophysical modelling to improve policy modelling in the European Union. BESTMAP has had a request approved for FADN data, which we will use in upscaling agent-based models from our case studies to an EU scale. We would be excited to see the following changes in the new Farm Sustainability Data Network:

Useful variables for agent-based modelling

As highlighted in the Roadmap, the FADN provides very few data on the social and environmental dimensions of EU agriculture. BESTMAP is aiming to assess the environmental performance of farms, both at present and under alternative policy scenarios, but this necessitates modelling decisions made by farmers. We think it is crucial for FSDN to enable policy design, rather than being a monitoring tool only – otherwise it does not fully “address the needs of the Common Agricultural Policy”. In BESTMAP, we are using agent-based modelling, but the lack of individual data in FADN makes such a behaviour-based approach challenging to upscale. Some specific data which would be valuable to include in the new FSDN may be:

- (1) behavioural aspects, e.g. by including questions on barriers/facilitators (incentives) for the adoption of sustainable farming practices (such as importance of financial aspects, status in society/acceptance by society, access to advisory services, ...)
- (2) identity-driven characteristics (e.g. pro-environmental values)
- (3) land tenure (owned/leased land)

Useful variables for biophysical modelling

To model the effects of farming practises on biodiversity and ecosystem services, it would be useful if FSDN data would include more detailed information on land use intensity, e.g. fertiliser and pesticide input (not just totals), grazing intensity and cutting/mowing frequency on grasslands, ploughing/tillage frequency on arable fields.

Access to spatial data

There would always be data that FSDN cannot obtain from farmers, and models would be a powerful tool to augment FSDN, e.g. to get a better idea of soil carbon stored on agricultural land. However, any application of such models requires environmental data (e.g. climate, soil) from existing fine-resolution datasets. We believe researchers should be allowed access to anonymized micro-level FADN data that includes geographic locations of the fields each farm is managing, in order to conduct meaningful research using FSDN to make it less difficult “..for farmers, farm advisors and policy-makers to identify and implement sustainable approaches”.

Currently, due to the unnecessarily complicated and time-consuming process required to access the data many resources are wasted. Allowing access to micro-level anonymized data would be GDPR compliant as it could not be directly linked with individuals or companies.

Compatibility to other European data

FADN data collection represents a significant financial commitment and is a crucial source of data for research in the agricultural sector, but its use is limited due to missing spatial information and compatibility with other data. Specifically, FADN is not easily compatible with the IACS/LPIS data that are available for research in many EU member states, which include information on the location of individual fields (farmer's blocks), the farm that manages them and a range of ancillary data (crop type, AES adoption, etc.). Linking IACS/LPIS with micro-level FADN data is not possible because the latter represent a relatively small sample of farms from a large heterogeneous region (in some cases a whole country) without any information on their location. There are also significant differences in nomenclature and classification systems (e.g. of crops). An effort to harmonise those datasets, possibly by combining data collection efforts and saving costs, would make both data products better.

2. Policy note for the future policy development of the Common Agricultural Policy (CAP)

BESTMAP conducted interviews with key policy influencers at the European level to explore the significant drivers of change and potential trade-offs associated with European agricultural policy.

The European Union's Green Deal sets out the objective of leading and supporting a global transition towards a sustainable food system. This entails various goals, such as increasing the allocation of land for carbon sequestration, biodiversity conservation, and the production of biomass for renewable energy. Additionally, the plan emphasises the reduction of synthetic inputs, the improvement of water quality, the protection of soil health, and the establishment of resilient systems to mitigate and adapt to climate change. Addressing food waste and encouraging a shift towards plant-based proteins are also key aspects of the initiative.

This policy note presents the findings of surveys conducted with representatives based in Brussels to identify priorities, challenges, trade-offs, and driving factors in achieving a sustainable food system. The focus of the surveys was on changes in the land system driven by policy, particularly within the CAP.

2.1 Method

The interviewees for this study were selected based on three criteria:

- a) They represent stakeholder groups involved in the pre-farm gate aspect of the agri-food value chain or are expert analysts of European agriculture policy.
- b) They are engaged in following European policy at the Brussels level.
- c) They are known to be active participants in the debate on the future of European agriculture.

After the final selection process, a total of 12 interviews were conducted with Brussels-based representatives from various sectors, including producers (farmer groups and sector producers), input industries (fertilisers, pesticides, machinery, etc.), environmental NGOs working on European agricultural policy, and expert analysts from think tanks.

It is important to note that this selection of interviewees does not represent the entire agricultural sector in Europe, and their Brussels representation limits their ability to reflect the circumstances of individual member states. However, this selection allows for a broad overview of the views of producers, major input industries, and environmental and climate concerns of NGOs.

All interviewees received an introduction and a set of questions (provided in Annex 1) with the invitation for the interview. The interviews were conducted using online meeting apps or phone, with the exception of one interviewee who submitted their answers in writing. Before the interviews began, each interviewee was informed that the transcript and recordings of the interview would not be made public and would remain confidential within BESTMAP, following the University of Leeds GDPR guidelines. Furthermore, the final report would not disclose the names of individuals or organisations. The full list of interviews is available upon request for these reasons.

The interviews were conducted by RISE between April and June 2020. Survey materials were developed collaboratively by RISE and the University of Leeds and underwent review by members of the consortium. A summary document was created to capture the key points discussed in each interview, and the answers were categorised according to sectors. The policy brief contents were developed in English by RISE in collaboration with the University of Leeds. To ensure high quality and adherence to accessibility requirements, a professional template provided by Pensoft was utilised. This ensured that the policy briefs were of a high standard and accessible to a wide audience.

2.2 Results

The policy note is featured in Figure 2 and can be accessed on the project website. The website includes a functionality that enables external users to provide comments and directly contact the corresponding author. In addition, the policy note was disseminated through project communication channels (email lists, newsletters, and social media). Furthermore, it will be presented to European-level stakeholders during the final event in Brussels, which is part of Activity 6.3.6 of the project.

Figure 2: Policy note – What does the European agriculture sector need from policy makers?



What does the European agriculture sector need from policy makers?

As part of Horizon 2020 BESTMAP project, we interviewed 12 Brussels-based representatives of agricultural producers, inputs industry, environmental NGOs and expert think tanks, on the drivers of change and the trade-offs in European Agriculture policy.

Their feedback showed support for four key objectives for the future policy development of the Common Agricultural Policy (CAP):

- **A fairer distribution of value in the food chain**
- Moving away from direct payments and income support to public funds for public goods
- Less policy uncertainty and better understanding and consideration of trade-offs, especially with regard to land use
- Policy that considers the food system as a whole

Transitioning the CAP from a policy for income support to a policy for public goods

- A majority of interviewees suggested an overhaul of the current CAP should focus primarily on shifting away from direct payments and income support, to a policy that looks at the food system holistically, and/or compensates only public goods.
- Focused investment in agricultural innovation.

Distribution of value

- Interviewees argued for a fairer distribution of value in the food chain; stronger social policies to deal with necessary increase in food prices.

Competing objectives

- Currently the permanent grassland definition encourages farmers to plough up fields before their pasture reaches five years. The definition should extend to 10 or even 20 years to promote long fallow periods in otherwise arable fields.
- Interviewees had differing views on whether de-intensification/lower inputs (as the Farm to Fork policy stipulates) will reduce outputs or make European farmers disadvantaged compared to imported produce. This could also change over time, i.e. long term lack of investment in improving soils may lead to an even greater reduction in outputs, if not addressed early enough.
- There is still uncertainty on whether the growth in demand for organic food will match the targets set out in the Farm to Fork and therefore whether the target of 25% organic by 2030 is financially achievable. Consumers need better understanding of policy trade-offs, e.g. meeting HRI objectives versus organic farming and the use of crop protection products such as copper sulphate.



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3. Policy notes specific to each CS and policy scenarios

The main objective of the policy notes was to translate the research findings of BESTMAP into actionable policy recommendations at the local level. These policy notes aimed to identify knowledge and data gaps that BESTMAP could not address and propose potential solutions to overcome them. Each Case Study (Humber Catchment - UK, Mulde River Basin - DE, South Moravia - CZ, Bačka Region - RS, Catalonia - ES) had its own policy note, which was based on the synthesis study (D4.4; M42) that compared the FSAs conducted in each Case Study and examined the impact of EU policies on them. Additionally, the policy note for the Serbian case study had a specific focus on the potential of the upcoming LPIS (Land Parcel Identification System) implementation.

3.1 Method

Before preparing each policy note, a "scoping document" was completed by each Case Study Leader. The development of the policy note's content began once the "Scoping document" was approved by the project consortium (see Annex 2). The policy notes' content followed general guidelines and a common structure. The contents of each policy note were developed either in English or in the local language of the respective Case Study.

The Case Study Leaders were responsible for developing the content of each policy note, while the RISE Foundation and the University of Leeds provided support by offering materials such as guidelines and structure, facilitating discussions, and validating the contents. During the BESTMAP General Assembly held in September 2022 in the Czech Republic, a training session on how to write a policy note was conducted by RISE for the partners involved in the activity. Additionally, dedicated online meetings were organised between March and June 2023 to assist the Case Study Leaders in each step of the policy note preparation. A professional template provided by PENSOFT was utilised to ensure high quality, consistency across the series, and compliance with accessibility requirements.

3.2 Results

The policy notes for each case study were finalised in June 2023 and contents (in the English version) are included in Figures 3-7. Policy notes in a professional template (either in English or in the local language) can be found in the project website. As an example, the policy note of the Czech case study with the professional template is included in Annex 3.

To disseminate the policy briefs, various channels and pathways will be utilised, including targeting relevant policy makers directly via emails or scheduled meetings, presenting them at relevant conferences, distributing paper copies at meetings or relevant events, mentioning them in press releases, publishing them on social media, distributing them through email lists or newsletters, alerting other theme-related projects or concerned institutions, requesting partners to share the briefs with their respective press offices, and highlighting the value of the briefs at workshops, training sessions, or webinars.

In September 2023, dedicated online meetings will be organised to develop specific dissemination strategies for each case study policy note. The starting point will be the "Scoping document," which already specifies the "main target audience," "policy relevance/opportunity," and "means of evaluation" for each policy note (see Annex 4).

Furthermore, the policy notes are available on the project website with a feature that allows external users to provide comments and get in touch directly with the corresponding author. They will also be distributed through project email lists, newsletters, and social media. The policy notes will be presented during the Final event in Brussels to European-level stakeholders at the end of the project (Activity 6.3b). The Council of Global Problem-Solving, which provides policy advice to the G20, will assist BESTMAP in distributing the policy notes.

Figure 3: Policy note – Humber Catchment – UK Case study

Horizon 2020 BESTMAP project recommendations for post-Brexit Environmental Land Management scheme design

Authors Rosemary Wood, Alan Gosal, Guy Ziv

Executive summary

- EU-project BESTMAP developed a new framework, which involved modelling the impact of certain agri-environment practices (AEP, an umbrella term including agri-environment schemes (AES) and ecological-focus areas (EFA)) in five heterogeneous case study areas, including the Humber catchment area in north-east England.
- BESTMAP primarily explored the spatial allocation of AEPs, the complexity of farmers' decision-making and preferences relating to AEP adoption and the impacts of AEP on ecosystem services and biodiversity.
- The main findings in the Humber study area indicate that, firstly, almost all AEPs occur most frequently on economically large, general cropping farms, especially cover crops, fallow land and vegetation buffers. Organic AEPs occur on a plethora of farm types. Secondly, farmers choose not to participate in AEPs as they do not provide a surplus of income nor do they feel they have enough advisory support. Lastly, AEPs were found to improve water quality, soil organic carbon and biodiversity, but they did not improve the production of food and fodder.
- In response to the research findings, in this policy brief we suggest that improving advisory and financial support for farmers will increase overall AEP uptake, and that AEP objectives and benefits should be better clarified to farmers.

Policy context

Around 75% of the UK's land area is used for agricultural purposes, much of it has been intensively used to produce feed and food at the expense of varying degrees of

environmental degradation. To combat this, the 2014-20 EU Common Agricultural Policy (CAP) features agri-environment schemes (AES), which function to compensate farmers for adopting environmentally-friendly practices. However, since the UK's withdrawal from the EU, the UK has moved away from CAP and towards a collective framework known as the Environmental Land Management schemes (ELMs), which will progressively replace current subsidies by 2027. In the House of Commons Environment, Food and Rural Affairs Select Committee 2020-21 inquiry 'Environmental Land Management and the agricultural transition', the select committee noted their objectives to investigate: "What lessons should be learned from the successes and failures of previous schemes paying for environmental outcomes?" (House of Commons, 2021: p.6). This policy brief therefore functions to address decision makers by conducting analysis on CAP AEP adoption within a UK context, and making recommendations for the design of policies during this transitional time period to contribute towards the official ELMs launch.

BESTMAP approach

The overall objective of the Horizon 2020-funded BESTMAP project (www.bestmap.eu) is to develop and enact a methodological framework for modelling the adoption and the impact of AEPs (agri-environment schemes and ecological-focus areas) on the agricultural landscape. The project considers farmers' decision-making and preferences, as well as the environmental impact of AEPs on biodiversity (specifically farmland birds) and ecosystem services (water quality, soil carbon sequestration, and food and fodder production). BESTMAP explored these factors in five contrasting case studies around Europe, including one in the Humber, UK, of which this policy brief centres on.

The Humber catchment study region is located in the northeast of England (Fig. 1). The shape of the study area is based on five National Character Areas (NCAs), which are each a distinct natural area defined by a unique combination of ecological, cultural and economic activities (Fig. 2). It covers an area of 4,664 km² consisting of flat peatlands to hilly terrain, and a temperate and maritime climate. Hydrologically, the Southern section of the catchment area drains via the River Ancholme into the Humber estuary, and further south drains through the River Eau towards the Wash (Ziv et al., 2020). As well as featuring several urban areas and semi-natural habitats, the Humber catchment region is also a major agricultural area, with fields covering ~80% of the case study area and an average Farm Business Income of ~£48,000 per farm in 2019/20 (DEFRA, 2023). Livestock, including pigs, sheep and cattle, also constitute a substantial proportion of agricultural land in the area (Ziv et al., 2020).



Fig. 1. © Farmers Weekly 2016: Typical farming landscape throughout Yorkshire and the Humber

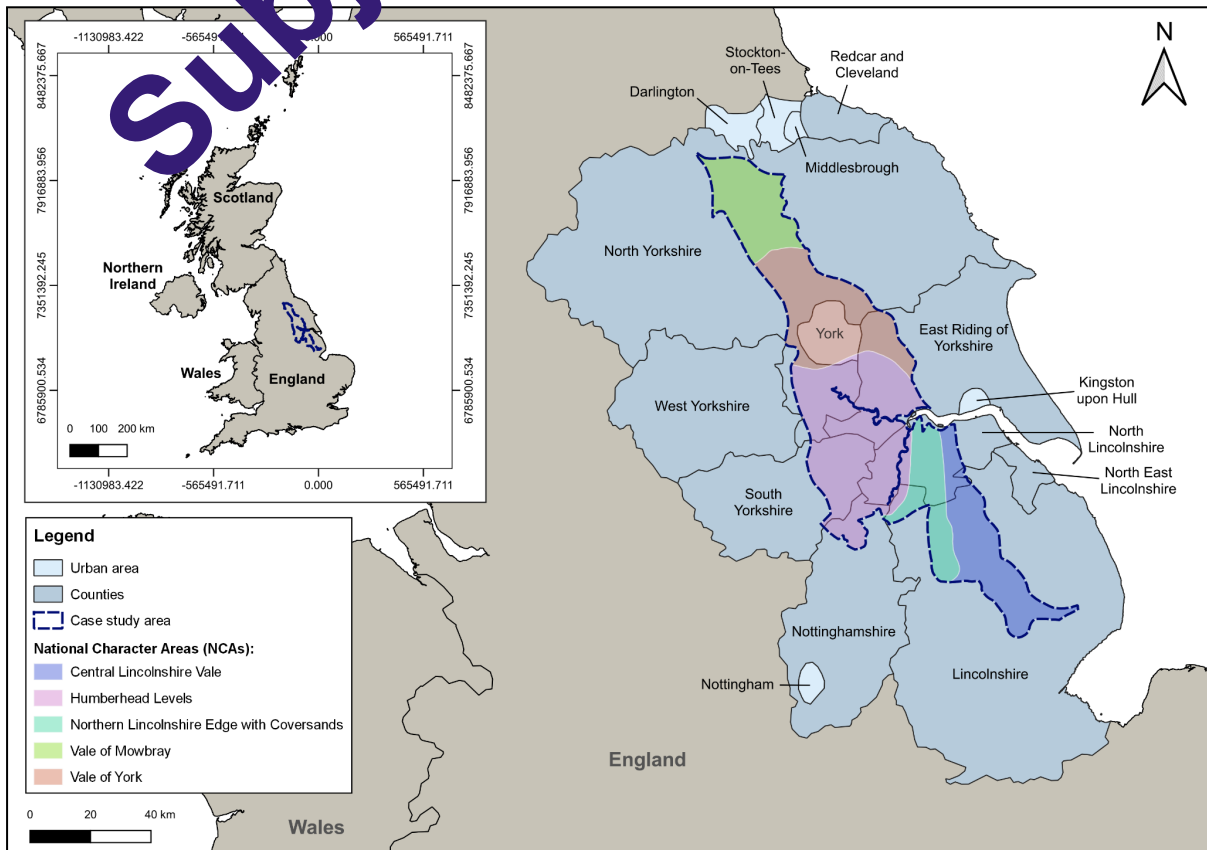
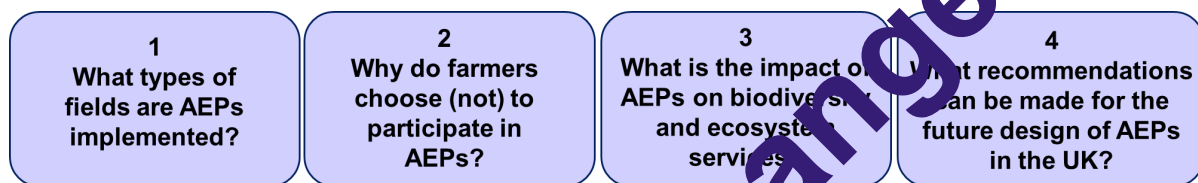


Fig. 2. Geographic location of the case study region, with reference to the placement within the UK in the insert map, and the counties and NCAs in the main map. Produced using QGIS software and taken from Wool *et al.* (2023).

Research objectives

Based on the BESTMAP approach, we focussed on the following key questions:



Results

What types of fields are AEPs implemented?

Using spatially-explicit data from the Rural Payments Agency (RPA), farms were classified based on their economic size (annual gross output in Euros) and type of production system according to the simplified Farm Accountancy Data Network (FADN) methodology. This classification into “farming system archetypes” revealed that the majority of the Humber case study farms focus on general cropping (P1), followed by farms focusing on grazing and livestock (P4) and farms combining both farm specialisations (mixed). All categories of economic sizes are common across different farm specialisations. However, the majority of grazing and livestock farms (P4) are small (<25k EUR) or very small (<2k EUR; the inclusion threshold used by FADN). The majority of general cropping farms (P1) and mixed farms belong to the large economic size category (>25k EUR).

When it comes to AEPs, BESTMAP considered seven interventions namely cover crops, maintaining permanent grassland, buffer areas, organic farming, conversion to permanent grassland, conversion to forest, and fallow land. All practices besides organic were most likely to be located on farms that were economically large and used for general cropping (Fig. 3). Cover crops, fallow land and vegetation buffers were almost exclusively (over 80%) located on this type of farm. Grassland maintenance, conversion to grassland and conversion to forest also appeared on small grazing and livestock farms or mixed large farms, and lastly organic AEPs were placed on the largest variation of farm types. Non-adopting farmers were most likely to be associated with small (2k-25k EUR) and very small (<2k EUR) farms.

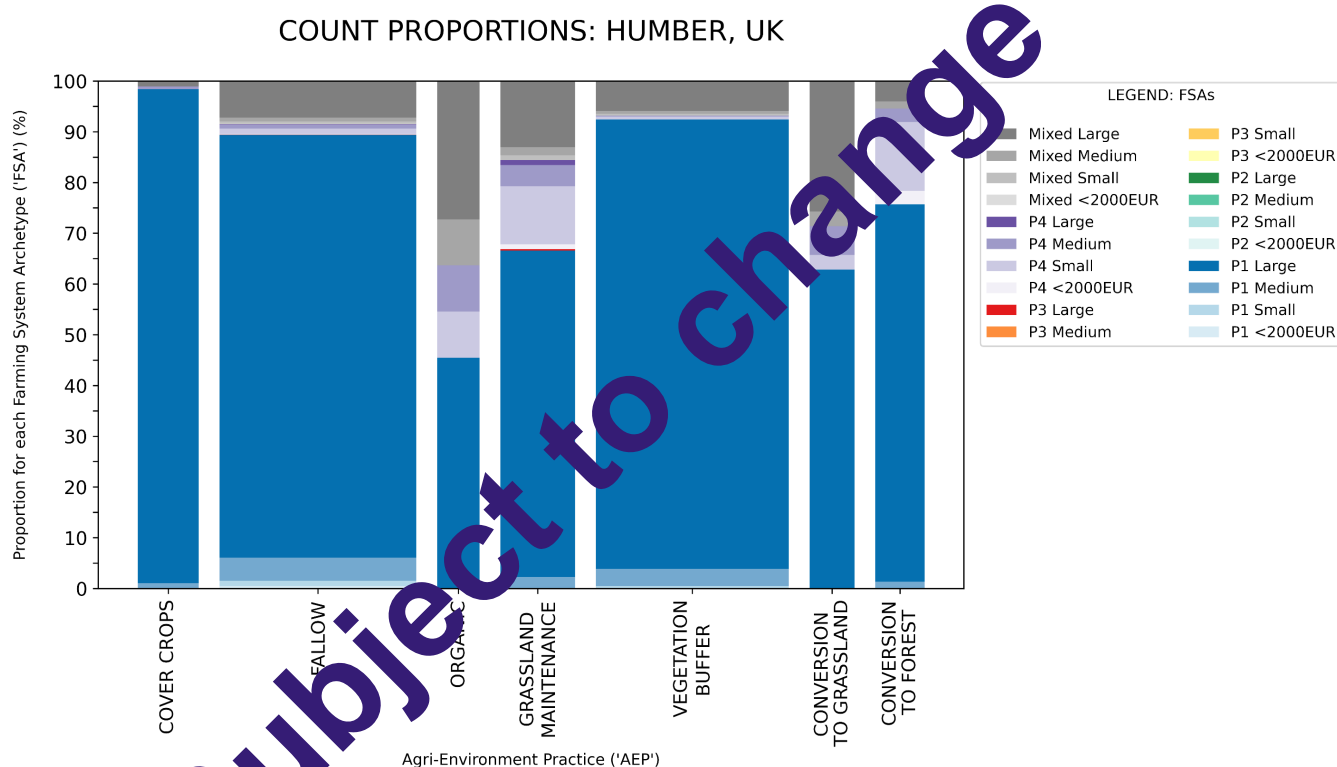


Fig. 3. The relationship between FSAs (P1 = general cropping; P2 = permanent crops; P3 = horticulture; P4 = grazing and livestock) and AEPs. The bar width is proportional to % of total number of farms, with the maximum total bar width being up to 10x the fixed minimum width. The total sample is calculated by the total sum of all farm counts adopting each AEP category, so a farm could 'count twice' or more in the 'total sample' if it adopts multiple AEPs.

Why do farmers choose (not) to participate in AEPs?

Firstly, it is important to address the overall low AEP adoption rate in the Humber. In 2019, the most commonly adopted type of AEP was fallow, and this was adopted on less than 8% of fields. Second was buffer strips, at ~3% of fields. Conversion to permanent grassland, cover crops, organic and maintaining permanent grassland AEP types were all adopted on less than 1% of fields in the area.

Secondly and according to interviews with 16 farmers conducted by BESTMAP during January to May 2020, reasons for farmers participation in AEP were:

- Receiving monetary compensation for implementing practices that fit well with the farming system already in place on the farm.
- The satisfaction of doing something good for biodiversity and/or the environment.

Reasons for non-participation included:

- Lack of support
 - According to a discrete choice experiment, advisory support is one of the most important factors in adopting AEPs, but it is not good enough.

- Lack of flexibility of the schemes and subsequent fear of an increased scrutiny of the government on individual farms' practices
- Loss of consultancy service due to change from personalised approach (Natural England) to a computerised system.
- Trust between advisors and farmers is low.
- Lack of time or resources to spend on understanding how to apply to a scheme, and what the different options within schemes are.
- The AEPs do not provide a surplus of income for the land destined to them, and, for farms located on very productive land, AEP participation is seen as a loss of potential income. Of multiple policy scenarios tested, a 10% increase in payments is likely to improve the uptake of buffer strips and grassland management AES.

What is the impact of AEPs on biodiversity and ecosystem services?

Comparing the present-day AEP adoption vs. a scenario with the removal of all AEPs, BESTMAP set of spatially-explicit models built using socio-economic and environmental data revealed that:

- Overall, AEPs improved water quality (by reducing nutrient export from farms), soil organic carbon (by increasing it very slightly), and biodiversity (by increasing farmland bird numbers), but had no effect on food and fodder production (expressed as standard output) (Fig. 4).
- Nitrogen export was improved the most on general cropping (P1) and mixed farms as a result of AEPs.
- Soil organic carbon was improved the most on economically large, general cropping (P1) farms as a result of AEPs.
- Biodiversity was improved the most on general cropping (P1) farms as a result of AEPs, but was negatively impacted on economically large, permanent crop (P3) farms.
- The effect of individual AEPs varies for different ecosystem services and biodiversity according to their specific targets.

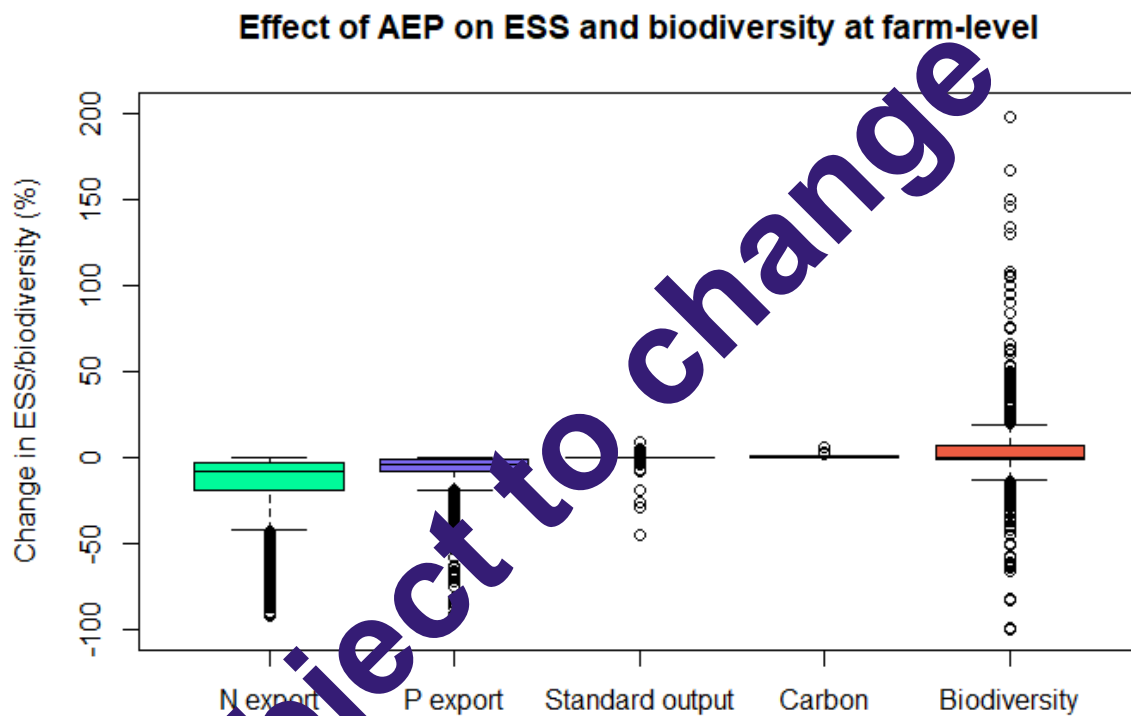


Fig. 4. Farm-level values of the percentage change of the modelled biodiversity indicator and ecosystem services between the two AEP adoption scenarios in the Humber case study area. Certain outliers (i.e. biodiversity >200%) were removed from the plot to ease visualisation.

What recommendations can be made for the future design of AEPs in the UK?

To increase AEP uptake by farmers, we recommend:

- **Improve farmer advisory support.** Difficulty understanding the options and the rules involved leads to mistrust and fear of sanctions, discouraging AEP adoption. Better advisory support could include the tailoring of suggestions based on farm systems, bringing back personalised support and building farmers' trust, especially through this substantial transition period in UK agriculture.
- **Increase financial incentive.** The monetary support must fully compensate farmers for their lost profit, and this is particularly true of highly productive land that suffers income loss when adopting AEPs. It is important to consider also the farmers risk and need for training and upskilling when setting payment levels.

To increase AEP environmental effectiveness, we recommend:

- **Increase the connectivity of AEPs.** A larger proportion of total land under AEP would provide improved environmental benefits as per our results but would also increase the connectivity of a system of nature-friendly practices.
- **Clarify AEP objectives and benefits.** As different farms benefit differently from AEPs depending on their local factors (i.e. near to water network), make sure it is

clear to farmers which AEP would be best in satisfying goals related to biodiversity and ecosystem service provisions.

Further information

Corresponding author: Guy Ziv is a Chair in Socio-Environmental Systems in the School of Geography at the University of Leeds, UK

Email: g.ziv@leeds.ac.uk

Arjan Gosal is a Lecturer in Socio-Environmental Data Science in the School of Geography at the University of Leeds, UK.

Email: a.gosal@leeds.ac.uk

Rosemary Wool is a Research Assistant on the BESTMAP project in the School of Geography at the University of Leeds, UK

Email: r.wool@leeds.ac.uk

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PROJECT NAME Behavioural, Ecological and Socio-Economic Tools for Modelling Agricultural Policy (BESTMAP)

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PROJECT DURATION September 2019 - February 2024

CONSORTIUM 13 partners from 8 European countries:
 University of Leeds, UK (coordinators)
 Cambridge Econometrics, UK
 Centre for Ecological Research and Forestry Applications (CREAF), Spain
 Helmholtz Centre for Environmental Research (UFZ), Germany
 Generalitat de Catalunya, Spain
 Mundialis, Germany
 Univerzita Palackého v Olomouci, Czech Republic
 Pensoft, Bulgaria
 BioSense Institute, Serbia
 Rural Investment Support for Europe (RISE), Belgium
 Technische Universität Dresden (TUD), Germany
 UK Centre for Ecology & Hydrology, UK
 Universität Basel, Switzerland

WEB	Bestmap.eu
TWITTER	@Bestmap_EU
FACEBOOK	@BestmapEU
REFERENCES	<p>DEFRA (2023). Farm Business Income (FBI): by Region (Farm Business Survey). Promar International. Department for Environment, Food and Rural Affairs. https://www.farmbusinesssurvey.co.uk/regional/Reports-on-Farming-in-the-Regions-of-England.asp</p> <p>Václavík, T., Čejka, T., Bednař, M., Will, M., Roilo, S., Beckmann, M., Paulus, A., Schneider, K., Bartkowski, B., Grujić, N., Brdar, S., Lugonja, P., Tomljenović, Marimon, C., Broekman, A., Wool, R., Gosal, A., Li, C., Breckenridge, G., Gunning, J. & Ziv, G. (2023). Systematic analysis of the case studies. Deliverable D4.4 EU Horizon 2020 BESTMAP Project, Grant agreement No. 817501.</p> <p>Wool, R., Breckenridge, G., Gosal, A. & Ziv, G. (2023). Assessing structural, biophysical and landscape factors in the adoption of agri-environment schemes by British farmers in the Humber region, UK. Manuscript in preparation.</p> <p>Ziv, G., Beckmann, M., Bullock, J., Cord, A., Delzeit, R., Domingo, C., Dreßler, G., Hagemann, N., Masó, J., Müller, B., Neteler, M., Sapundzhieva, A., Stoev, P., Stenning, J., Trajković, M., & Václavík, T. (2020). BESTMAP: behavioural, ecological and socio-economic tools for modelling agricultural policy. <i>Research Ideas and Outcomes</i>, 6, e52052. https://doi.org/10.3897/rio.6.e52052</p>

Figure 4: Policy note – Mulde River Basin – DE Case study

Improving uptake and effectiveness of agri-environmental practices in Saxony: Recommendations from the European BESTMAP project

Authors Michael Beckmann, Anna Cord, Nina Hagemann, Anne Paulus, Stephanie Roilo

Executive summary

- The EU funded project BESTMAP investigated the impact of agri-environmental practices (AEP, an umbrella term including agri-environmental schemes and ecological focus areas) in the Mulde river basin in Saxony,
- BESTMAP provides information on farmers' motivations for (not) participating in AEP, on the spatial distribution of AEP, and on the impacts of AEP on biodiversity and ecosystem services,
- Based on our findings, we give recommendations to achieve broader adoption and advocate for more ambitious, clearly defined objectives of AEP to achieve positive impacts on biodiversity and ecosystem services.

Policy context

Population growth and a consumption-oriented lifestyle led to an ever increasing demand for food production. At the same time, the intensive use of agricultural land has a negative impact on the environment. For that reason, AEPs are used to increase the sustainability and multifunctionality of agricultural landscapes. These practices are part of the European Union's Common Agricultural Policy (CAP). Their evaluation at the state level of governance is especially valuable for developing regional solutions towards a more sustainable agriculture. This policy brief provides recommendations for the mid-term review of the Saxon Rural Development Programme 2023-2027 CAP and the post-2027 CAP funding period.

Research goals

The Mulde region covers an area of 5,800 km², spanning from the Pleistocene Elbe-Mulde-lowlands in the north to the Ore Mountains in the south. Winter wheat, oilseed rape, winter barley, and maize are the predominant crops. Along the river and in the Ore Mountains, permanent grassland dominates.

The project evaluated the environmental impact of various AEP implementation scenarios on biodiversity, in particular farmland birds, water quality, carbon sequestration, and food and fodder production.

Specifically, we focused on these four key questions:

- Why do farmers (not) participate in AEP?
- On what types of fields are AEP implemented?

- What is the impact of AEP on biodiversity and ecosystem services (water quality, carbon sequestration, and food and fodder production)?
- What recommendations can be made for the future design of AEP in Saxony?

Why do farmers (not) participate in AEPs?

Based on interviews and questionnaire among farmers conducted in the period 2020-2022, we found that:

- Farmers' willingness to adopt AEP is limited by the associated bureaucratic burden (e.g. paperwork and administrative effort) of AEP implementation, which is particularly high for small farmholders with limited resources (Fig. 1, Bartkowski et al., 2023; Wittstock et al., 2022)
- Many farmers state that AEP do not fit into their farm management plan (Fig. 1)
- The strict regulations for implementing AEPs (e.g. fixed mowing dates, minimum area requirements) also discourage farmers from participating in AEPs, as the associated risk of sanctions is too high (Fig. 1; Bartkowski et al., 2023)
- Also, while farmers are generally convinced of the ecological benefits of AEP (Fig. 1), they question the specific design and effectiveness of certain schemes (Bartkowski et al., 2023).

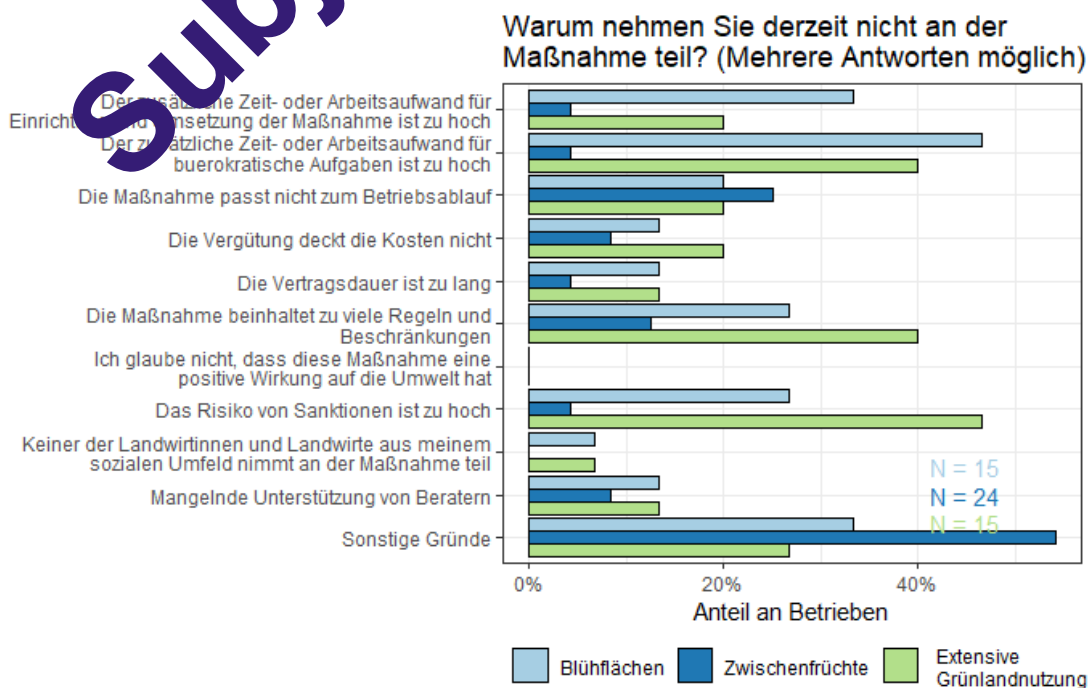


Figure 1: Results from the choice experiment directed at farmers in Saxony (N = 74, including only farmers who did not participate in AEPs in the past), surveying their motivations for (not) participating in three types of AEP, namely flower areas, cover crops, and maintaining permanent grasslands.

On what types of fields are AEPs implemented?

Using spatially-explicit information from the Integriertes Verwaltungs- und Kontrollsystem (InVeKoS) database and geospatial modelling techniques, we found that:

- AEP are often implemented on less fertile and more difficult to cultivate fields (e.g. small fields on steep slopes, with poor soil quality or on forest edges), presumably to minimise yield loss
- AEP are more frequently placed on permanent grassland than on arable fields
- AEP are often allocated on fields located in protected areas (e.g. Natura2000)

What is the impact of AEP on biodiversity and ecosystem services?

Using various spatially-explicit models based on both socio-economic and environmental information, we found that:

- Overall, AEP generally improve biodiversity, soil organic carbon and water quality (i.e. by reducing nutrient export), but reduce food and fodder production expressed as standard output, as seen by a comparison with an imaginary scenario where no AEP exist (Fig. 2), although the differences across scenarios are small,
- However, the effect of individual AEP varies for different ecosystem services and biodiversity, as many of them target specific environmental goals (Paulus et al., 2022). Non-productive AEP, like buffer strips and fallow land, are often more effective than productive ones, but are not as widely adopted by farmers (Paulus et al., 2022),
- The effects of AEP on (farmland bird) biodiversity could be enhanced through a wider adoption, i.e. implementation of AEP on more fields (Fig. 3, Roilo et al., 2023).

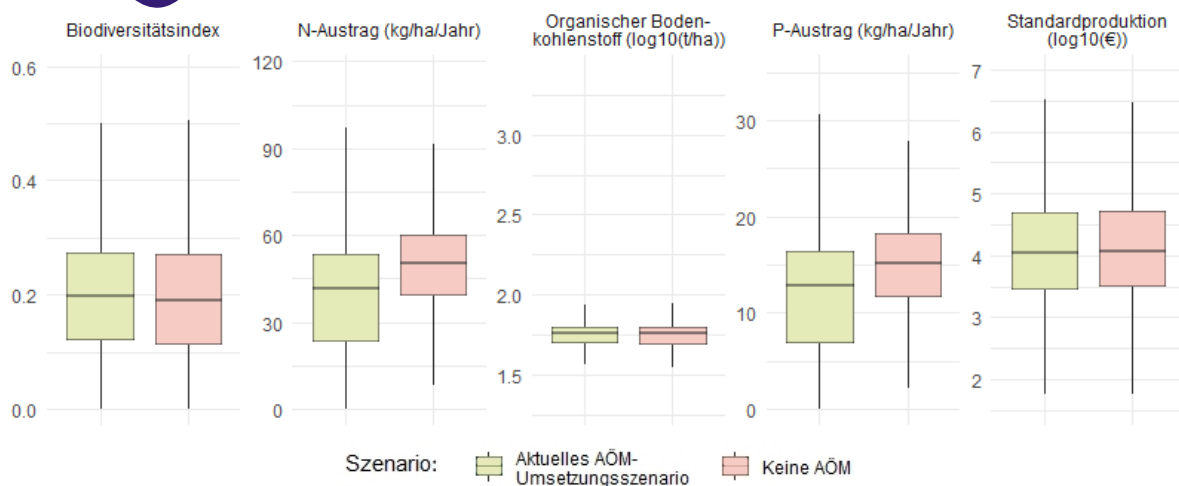


Figure 2: Comparison of farm-level values in ecosystem services' provision and biodiversity in the Mulde river basin for the current AEP adoption scenario (green), and an imaginary scenario without AEP (red). N = Stickstoff, P = Phosphor. For more details, see Václavík et al. (2023).

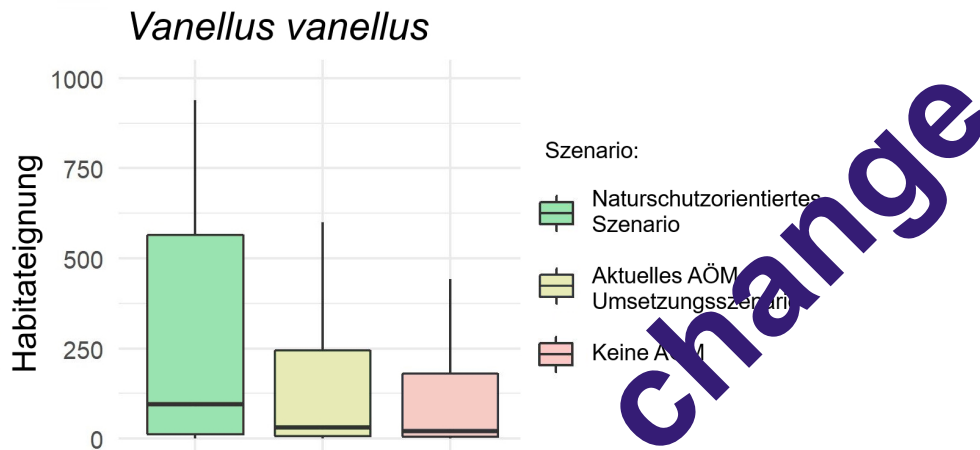


Figure 3: Habitat suitability for the lapwing (*V. vanellus*) under three different AEP adoption scenarios: a conservation-oriented scenario with increased AEP levels (CONS), the current adoption scenario (CURR), and a scenario with no AEP (NOAE). For details, see Roilo et al., 2023.

What recommendations can be made for the future design of AEPs in Saxony?

In order to increase the uptake of AEP by farmers, we recommend the following:

1. **Reduce obstacles to the implementation of AEP.** Bureaucratic burden and fear of sanctions discourage farmers from participating in AEP. Advisory services can provide advice on which AEP fit the farm management plan and can support farmers in the application process (e.g. DIANAWeb software). This will decrease the perceived bureaucratic burden, thereby increasing farmers' willingness to participate in AEP, especially for smallholders.
2. **Increase transparency by clearly communicating the objectives and ecological outcomes of AEP.** This can help increase farmers' willingness to participate in the AEP, whose design and ecological effectiveness are sometimes questioned by farmers.

In order to increase the effectiveness of AEP, we recommend the following:

3. **Clearly define regional environmental objectives to be achieved through AEP.** For example, setting minimum goals for biodiversity conservation and ecosystem service provision for specific landscapes or regions is essential to determine which AEP need to be implemented where. Depending on the region, different environmental objectives may be prioritised.
4. **Implement more ecologically ambitious and effective AEP.** This should include non-productive measures on cropland, such as fallow land and buffer strips.
5. **Spatially distribute AEP according to environmental rather than economic considerations.** In complex landscapes with high levels of biodiversity and ecosystem services, measures should be implemented to support farmers to maintain, rather than to change, existing extensive land-use practices. In simple,

more intensively used landscapes, AEP should be offered that require a change in farming practices to increase the level of ecological and landscape complexity.

Weiterführende Literatur

- (1) Alarcón-Segura, V., Roilo, S., Paulus, A., Beckmann, M., Hagemann, N., Cord, A.F. (2023): Farm structure and environmental context drive farmers' decisions on the allocation of ecological focus areas in Germany. Submitted to *Landscape Ecology*.
- (2) Bartkowski, B., Beckmann, M., Bednář, M., Bajić, S., Domingo-Marimon, C., Mesaroš, M., Schüßler, C., Šarapatka, B., Tarčak, S., Václavík, T., Ziv, G., Wittstock, F. (2023): Adoption and potential of agri-environmental schemes in Europe: Cross-regional evidence from interviews with farmers. Submitted to *People and Nature*.
- (3) Paulus, A., Hagemann, N., Baaken, M.C., Roilo, S., Alarcón-Segura, V., Cord, A.F., Beckmann, M. (2022): Landscape context and farm characteristics are key to farmers' adoption of agri-environmental schemes. *Land Use Policy* 121. <https://doi.org/10.1016/j.landusepol.2022.106320>.
- (4) Roilo, S., Engler, J.O., Václavík, T., Cord, A.F. (2023): Landscape-Level Heterogeneity of Agri-Environment Measures Improves Habitat Suitability for Farmland Birds. *Ecological Applications* 33(4). <https://doi.org/10.1002/eap.2720>.
- (5) Wittstock, F., Paulus, A., Beckmann, M., Hagemann, N., Cornelia Baaken, M.C. (2022): Understanding farmer's decision-making on agri-environmental schemes: A case study from Saxony, Germany. *Land Use Policy* 122. <https://doi.org/10.1016/j.landusepol.2022.106371>.
- (6) Václavík, T., Mejka, T., Bednář, M., Will, M., Roilo, S., Beckmann, M., Paulus, A., Schneider, K., Bartkowski, B., Grujić, N., Brdar, S., Lugonja, P., Domingo-Marimon, C., Broekman, A., Wood, R., Gosal, A., Li, C., Breckenridge, G., Gunning, J. & Ziv, G. 2023. Systematic analysis of the case studies. Deliverable D4.4 EU Horizon 2020 BESTMAP Project, Grant agreement No. 817501.

Über die Autor:innen

Michael Beckmann (michael.beckmann@ufz.de) is head of the working group Biodiversity and Ecosystem Services at the Department Computational Landscape Ecology at the Helmholtz Centre for Environmental Research - UFZ. **Anne Paulus** (anne.paulus@ufz.de) works there as an environmental scientist.

Anna Cord (anna.cord@tu-dresden.de) is professor for Computational Landscape Ecology at the Technische Universität Dresden. **Nina Hagemann** (nina.hagemann@tu-dresden.de) works at the chair as a political scientist, and **Stephanie Roilo** (stephanie.roilo@tu-dresden.de) works there as an ecological modeller.

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Subject to change



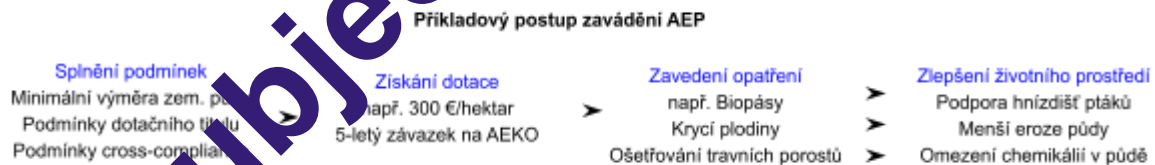
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Figure 5: Policy note – South Moravia – CZ Case study

Agri-environmental practices in agricultural landscapes. insights and recommendations from the European project BESTMAP

Population growth and consumerist lifestyles are leading to increasing demands for stable food production. However, traditionally, the more intensive use of agricultural land was not considering environmental aspects, thus having a negative impact on the environment. For this reason, agri-environmental practices (AEP for short) are used in agriculture to increase the sustainability and multifunctionality of the agricultural landscape. Instruments that are part of the EU's Common Agricultural Policy include, in particular, agri-environmental-climatic measures (AECM), payments for greening, e.g. ecological focus areas (EFAs), or organic farming.



The aim of the BESTMAP project was to develop a methodological framework for modelling the impact of agricultural policies (mainly AEP) on the agricultural landscape. The project's methods take into account the complexity of farmers' decision-making and the different preferences of different types of farms. At the same time, the project assesses the impact of different AEP implementation scenarios on biodiversity and ecosystem services in the case study area of the South Moravian and Zlín regions. Specifically, we sought to answer four key questions:

Jaké typy farem využívají AEP?

Proč zemědělci (ne)výžívají AEP?

Jaký je dopad AEP na biodiverzitu a ekosystémové služby?

Jaká doporučení lze vyvodit pro budoucí implementaci AEP v ČR?

What types of farms use agri-environmental practices?

From the Land Parcel Identification System (LPIS) database, a classification of farms, the so-called farming system archetypes, was created on the basis of economic size and production focus according to the simplified Farm Accountancy Data Network (FADN) methodology. The spatial analysis of the farm archetypes and the data of the Ministry of Agriculture on the use of subsidy titles revealed that:

- In terms of the total number of farms, 28% are focused on crop production (P1), 32% on permanent crops (P3), 23% on livestock and forage production (P4), 16% on mixed crop and livestock production (mix), and <1% on horticulture (P2). P1 farms are typically large in terms of economic size; P3 and mixed farms are more evenly distributed across all economic size classes; P4 farms are mostly small farms.
- The vast majority of farmland (78%) is farmed by economically large farms focused on crop production (P1).
- Large farms are more likely to use AEP while implementing a broader portfolio of measures, while small farms use AEP less frequently and focus on a few types of measures.
- Higher uptake of agri-envi programmes is found on livestock farms (77%) and permanent crops (61%). The lowest proportion of AEPs is found on arable farms (19%).
- Some types of AEP (e.g. biogas, cover crops and fallow) are primarily used by large farms focused on arable or mixed production, while grassland treatment and organic farming are more common on medium and small farms focused on livestock and permanent crops (Figure 1).
- Organic production is found in all farm archetypes (Fig. 1), but farms operating under organic farming are less likely to use other agri-environmental instruments (AECM, EFA) compared to conventional farms.
- Farms not using any of the AEPs are in most cases of small economic size (Fig. 1).

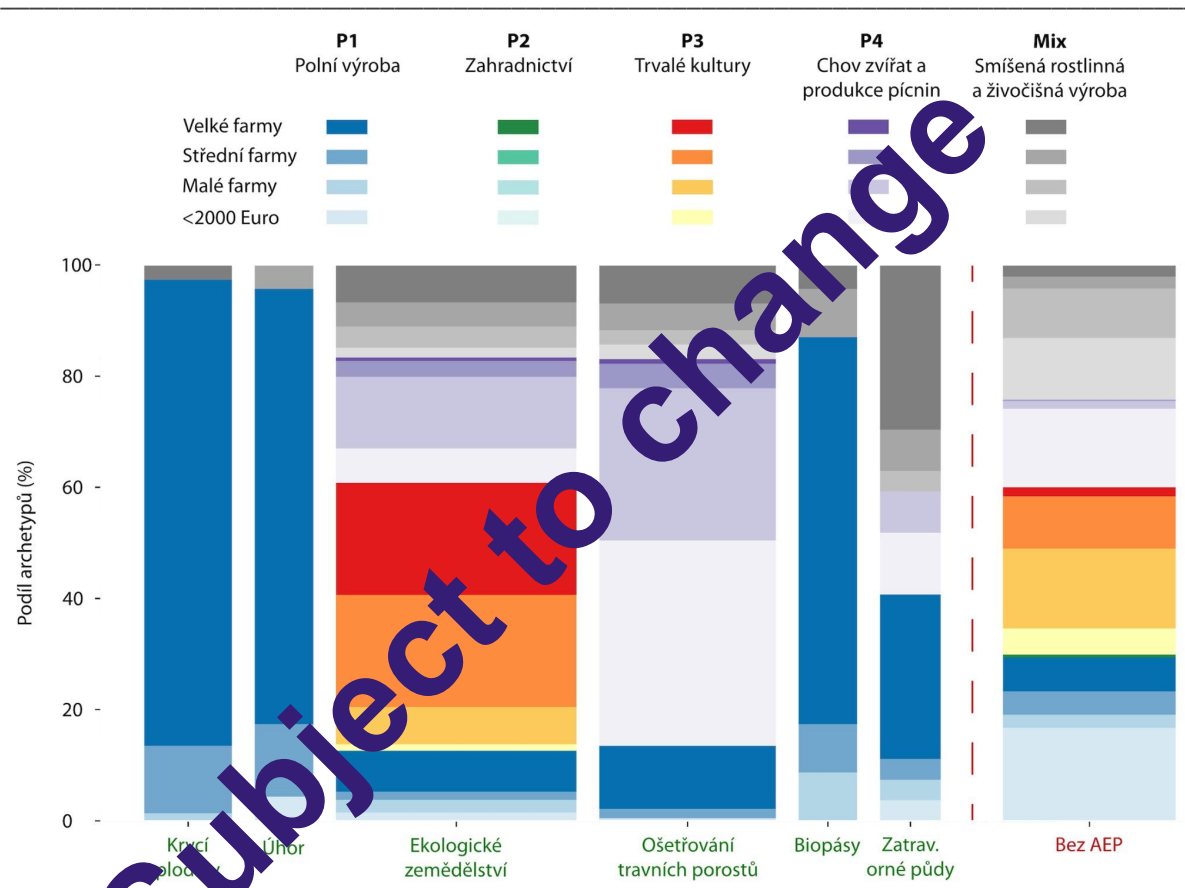


Figure 1: Use of selected agri-environmental approaches (AEPs) across different farm types.

Why do farmers (not) use agri-environmental approaches?

Based on structured interviews and questionnaire surveys of farmers conducted between 2020 and 2022, supplemented by the results of multi-agent decision-making models, we found that:

- The main motivation for farmers to adopt AEP is economic compensation for lost profits and income diversification. The environmental impact of farming is a secondary reason. The economic benefits of AEP are more significant for conventional farms than for organic farmers.
- Farmers tend to apply only those AEPs that are consistent with their established farming practices.
- Awareness of the introduction of AEPs is good, but farmers criticise the high bureaucratic burden which, due to the lack of administrative capacity, constraints especially smaller farms.
- Farmers' motivation is largely related to the duration of the support. For permanent grassland measures, farmers would prefer longer commitments, whereas for arable

measures they prefer shorter or more flexible commitments. Long-term measures are preferred provided that farmers have long-term tenancy agreements (90% of farmers farm on rented farmland, while only 20% are owners).

- According to farmers, the main barriers to increased use of AEP are:
 - Insufficient financial compensation for the difficulties of farming
 - Strict conditions for individual measures (e.g. minimum area, fixed dates for mowing or grazing)
 - Excessive bureaucratic burden













	Květnaté plochy/biopásy	Krnčí plodiny	Ošetřování travních porostů	Zatravňování orné půdy	Bez opatření
Doba trvání smlouvy	1 rok 	5 roků 	5 roků 	5 roků 	Na vaší farmě byste neobdrželi žádnou finanční podporu související s agroenvironmentálními programy.
Poradenství	Ne 	Ne 	Ne 	Ne 	
Administrativní zátěž	Střední 	Střední 	Střední 	Nízká 	
Roční platba	675 EUR/ha	75 EUR/ha	215 EUR/ha	1200 EUR/ha	

Figure 2: Sample of a portion of the survey (September 2021-April 2022) where farmers selected from several hypothetical AEP settings based on their preferences.

What is the impact of AEP on biodiversity and ecosystem services?

Based on a wealth of data on landscape structure, climate and soil parameters, crops grown, and farm characteristics and management, bio-physical models were developed for biodiversity (e.g. farmland birds) and three selected ecosystem services: (1) standard agricultural production, (2) nutrient levels in surface water, and (3) soil organic carbon. Using these models, the environmental impact of AEP was assessed and scenarios of different agri-environmental implementation were compared. The results show that:

- AEPs increase the habitat quality of indicator taxonomic groups (e.g. farmland birds) in agricultural landscapes (Fig. 3). The degree of positive effect depends on the type of AEP, the species and the spatial scale.

- Habitat connectivity with natural features at a broader landscape scale is more important than specific measures at the site of a given species. This is particularly true for measures on arable land; on permanent grassland the local effect of individual measures is also important.
- The effect of AEP on biodiversity is positive but weak. The current level of implementation of AEP, covering on average less than 5% of agricultural land, is too low to have a significant impact on biodiversity.
- The use of AEP leads to a slight reduction in standard production for most measures and farm types, especially livestock and mixed farms.
- However, the introduction of AEP has a positive effect on surface water quality as it leads to a reduction in the export of nitrogen (N) and phosphorus (P) to water sources, again particularly for livestock and mixed farms.
- AEPs also increase soil organic carbon on average across all farm archetypes, depending on the specific measure, crops grown and intensity of management.

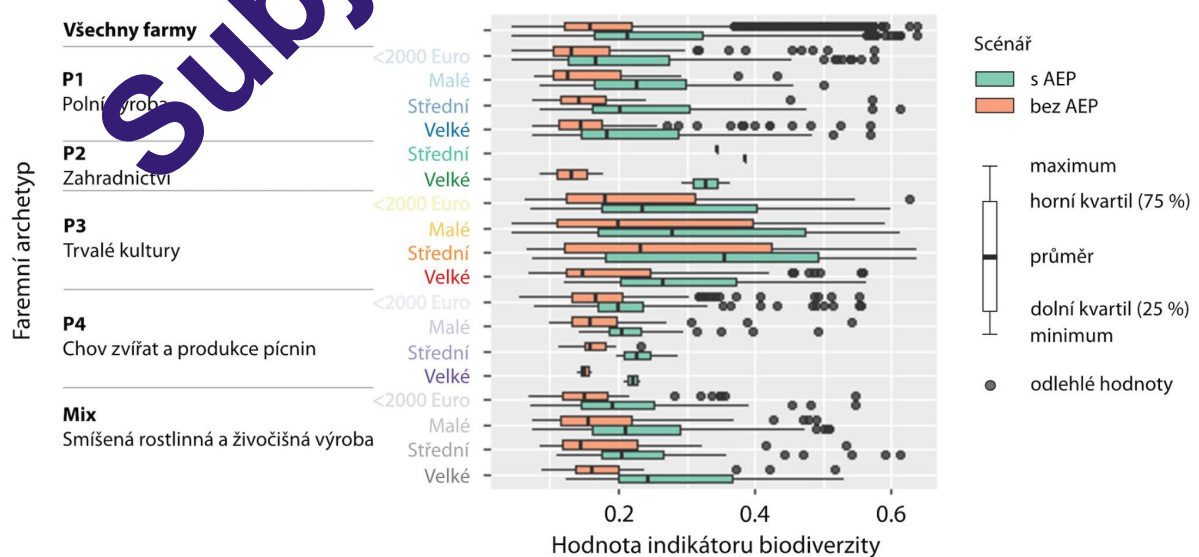


Figure 3: Impact of AEP on habitat quality of farmland birds - comparison of current AEP status with a scenario simulating the absence of AEP on agricultural land at the level of individual farm archetypes.

What recommendations can be drawn for the future implementation of AEP in the Czech Republic?

Based on information from farmers, analyses of environmental and socio-economic data, and models developed taking into account the complexity of decision-making of different types of agricultural actors, we can conclude the following.

To increase the use of AEP by farmers, it is desirable to:

- Increase the level of financial support so that it sufficiently compensates farmers for the lost profit for the difficulties of farming.
- Reduce the level of bureaucratic burden, which is a major obstacle to the introduction of AEP, especially for farms of small economic size.
- Increase administrative support and access to high quality advice for free that can help to reduce the bureaucratic burden and to integrate AEP into farm management plans.
- Increase flexibility in the terms of individual AEP commitments in terms of length of contracts, minimum acreage requirements, cutting and grazing dates, etc. Allocate more funding to Pillar II and the newly created more flexible 'eco-schemes' which partly take over the function of greening and AEKO.
- Clearly communicate the objectives and environmental benefits of AEP to help increase farmers' willingness to participate in schemes whose benefits are often unclear or unconvincing to farmers.

In order to increase the benefits of AEP for biodiversity and ecosystem services it is desirable:

- Increase the total area of established AEPs to form a more interconnected system of nature-friendly management of farmland.
- Aim to increase the percentage of established AEPs on large farms and increase participation in agri-environmental programmes on small farms.
- Offer a broad portfolio of diverse measures whose implementation would provide a diversified mix of shelter habitat and food resources for different taxonomic groups.
- Allow for more focused biodiversity schemes outside of AEP, which, e.g. define minimum conservation targets that must be met for a particular site, habitat type or specific species. Ensure better spatial or species targeting through results-based measures.
- More clearly define the expected benefits of AEP for the provision of ecosystem services, e.g. minimising nutrient leaching in sensitive areas or maintaining adequate soil properties to ensure long-term productivity. Determine which types of AEP are appropriate for specific objectives.
- Consider the possibility of cooperative schemes involving the joint involvement of neighbouring farms, e.g. to link habitats or to achieve a minimum required AEP area, which may support the effectiveness of AEPs at a wider landscape scale.

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AUTOŘI	Tomáš Václavík, Tomáš Čejka, Marek Bednář, Bořivoj Šarapatka
KONTAKT	Katedra ekologie a ŽP, Přírodovědecká fakulta, Univerzita Palackého Olomouc doc. Tomáš Václavík, tomas.vaclavik@upol.cz, +420 585 634 555 prof. Bořivoj Šarapatka, borivoj.sarapatka@upol.cz, +420 585 634 560
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WEB	Bestmap.eu
TWITTER	@Bestmap_EU
FACEBOOK	@BestmapEU
DALŠÍ ZDROJE INFORMACÍ	<p>Václavík T, Čejka T, Bednář M, Will M, Roilo S, Beckmann M, Paulus A, Schneider K, Bartkowski B, Grujić N, Brdar S, Lugonja P, Domingo-Marimon C, Broekman A, Wool R, Gosal A, Li C, Breckenridge G, Gunning J & Ziv G. 2023. Systematic analysis of the case studies. Deliverable D4.4 EU Horizon 2020 BESTMAP Project, Grant agreement No. 817501.</p> <p>Cord A, Roilo S, Beckmann M, Paulus A, Schneider K, Lugonja P, Nikolic T, Langerwisch F, Bednář M, Václavík T, Evans P, Gosal A, Wool R, Breckenridge G, Gunning J & Ziv G. 2022. ESS, biodiversity and socio-economic models for each case study. Deliverable D3.3 EU Horizon 2020 BESTMAP Project, Grant agreement No. 817501.</p> <p>Bartkowski B et al. 2023. Adoption and potential of agri-environmental schemes in Europe: Cross-regional evidence from interviews with farmers. People and Nature (in review).</p> <p>Roilo S, Engler JO, Václavík T, Cord AF. 2023. Landscape-Level Heterogeneity of Agri-Environment Measures Improves Habitat Suitability for Farmland Birds. Ecological Applications 33(1). https://doi.org/10.1002/eap.2720.</p>

Wittstock F, Paulus A, Beckmann M, Hagemann N, Cornelia Baaken MC. 2022. Understanding farmers' decision-making on agri-environmental schemes. *Land Use Policy* 122. <https://doi.org/10.1016/j.landusepol.2022.103711>

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Subject to change

Figure 6: Policy note – Bačka Region – RS Case study**Introducing agri-environmental measures in Serbia**

Authors Sonja Tarčak, Tijana Nikolić Lugonja, Predrag Lugonja, Miljana Marković, Nastasija Grujić, Sanja Brdar

Corresponding author: Sanja Brdar (sanja.brdar@bri.sense.rs)

Introduction

Agri-environmental measures (AEM) aim to mitigate the environmental impact of agriculture by promoting and financing sustainable agricultural practices. As Serbia is making initial steps towards introducing AEM, informed decision making will be necessary, so as to design measures that are both suitable for Serbian farmers and beneficial for the environment. Through the BESTMAP, an EU-funded project, the international team of researchers examined for the first time potential benefits of introducing AEM in a selected region in Serbia.

Executive summary

- BESTMAP identified an initial set of AEM (based on their suitability for the local context) and investigated their potential impact in Bačka, the region with the most intensive agriculture in Serbia.
- BESTMAP provided information on the reasons behind farmers' future (non)adoption of the AEM, on existing surrogate measures (semi-natural vegetation elements already existing in agriculture landscape without any financial support) and their spatial distribution, and on the impact of selected AEM on biodiversity and ecosystem services.
- Based on our findings, we recommend introducing simpler agri-environmental measures for beginning that fit local agricultural practices. This will increase the chance that the response of farmers will be greater, and it will still have a positive impact on the environment.

Policy context

In the past decade, institutional and policy reforms in Serbian agriculture have been significant, but the capacity to address environmental challenges remains limited. Despite the recognised need to introduce agricultural practices that reduce negative impact on the environment (National Strategy on Sustainable Development, Environmental Strategy and Biodiversity Strategy), programmes and measures to fulfil this need were missing. The strategic framework for the implementation of agricultural policy is defined by the Strategy of agriculture and rural development (2014-2024) and the IPARD program (the EU instrument for support in the field of rural development). Although the strategy incorporates environmental dimension, priorities were on social and economic sides thus far. Only organic production and conservation of agrobiodiversity were supported through direct payments.

Agri-environmental measures are now incorporated in the IPARD III program (2021-2027), but it is first necessary to form favourable conditions to implement the support for them.

Research objectives

In this context we aim to evaluate options for future AEM in Serbia based on: 1) simulation of farmers' adoption of AEM (understanding the decision-making process by the producers themselves) through different options for contracts (duration, level of administrative effort, offered payment per hectare), and 2) assessment of AEM environmental impact (predicting the effect of implementing 5 common agri-environmental measures in Europe).

The study area

Study was performed for Bačka district in Vojvodina region. Intensive agricultural land use is prevailing here. Agricultural areas categorized as general cropping are the most dominant farm system archetypes in the Bačka region. Due to flat topography and high soil quality, the region is ideal for growing cereals such as wheat and maize. Horticulture and fruit-growing is also significant. Areas of vegetable production are scattered over smaller or bigger areas across Bačka. Wine growing production is present in Subotica-Horgos sandy terrain. Unfortunately, an increase in arable lands has been happening at the expense of natural areas. In the past 70 years grasslands have radically declined, and today occur as isolated islands, which had negative consequences for biodiversity and the environment.



Figure 1: Landscapes of Bačka region - Crops as dominant land use pattern vs semi-natural vegetation in agricultural land

Five groups of commonly applied AEM across Europe were found suitable for the study area: cover crops, flower strips, grassland maintenance, arable land conversion to grassland and organic farming. These were explored from the aspects of farmers acceptance and environmental impact.

AGRI-ENVIRONMENTAL MEASURES



LANDSCAPE FEATURES



Figure 2: Selected AEM for the analysis and landscape features generated by ground truth data, remote sensing and machine learning that are further used in biophysical models

The BESTMAP approach

The BESTMAP developed a behavioural theoretical modelling framework that takes into account complexity of farmers' decision-making. Computer models, concretely agent-based models (ABM), are linked to existing data on farms and remote sensing products. Through simulation of individual-farm agents and their decisions and interactions with other agents complex scenarios of AEM adoption emerge. BestMap approach further includes economic, biophysical and biodiversity models to quantify the impact of AEM and precisely compare different scenarios.

Diverse types of data were integrated into the BESTMAP framework to run scenarios of AEM adoption and to quantify their impact. Information on farms comes from the National Platform for Digital Agriculture - AgroSens (Fig. 3). More than 200 farmers participated in the targeted survey designed by BESTMAP social scientists that examined conditions under which they would accept certain AEM and 25 farmers took part in interviews. This served for running 9 different scenarios of AEM adoption. In the status quo scenario farmers are offered contracts with following basic characteristics: 5 years long, medium administrative effort, no advisory, implementation and maintenance costs are covered. In the case of the other scenarios, one of these basic contract characteristics was changed each time: increased payments, added advisory, shorter contract, longer contract, low administrative effort, high administrative effort. Two scenarios examined the social influence of neighbours, and the social influence of a village.

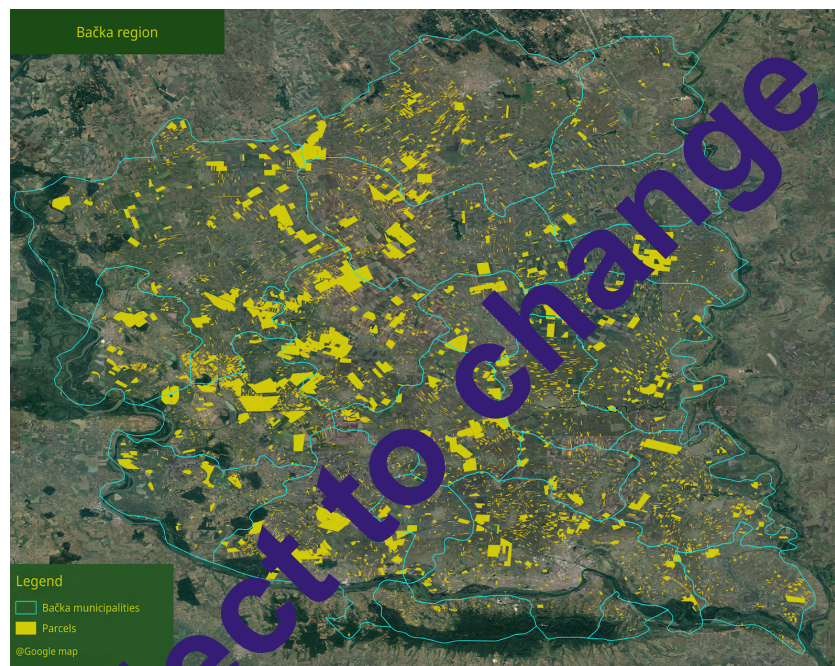


Figure 3: AgroSens database in Bačka region with 1355 farmers and corresponding parcels with overall coverage of 41,000 ha.

Additional data was used to assess the environmental impact of AEM. Land cover maps, detailed crop maps and soil quality estimates were derived from satellite data. Combination of the derived layers and databases resulted in spatial identification of the selected “surrogate” measures: linear elements and fallow land (Fig. 2). Biodiversity data included selection of grassland related species: farmland birds (source: The Society for the Protection and Study of Birds of Serbia) and small mammal grassland specialists (BioSense Institute own database) from observational studies. Additional data needed for the Nutrient Delivery Ratio model (NDR) (Sharp et al. 2020) that quantifies export of nitrogen and phosphorus into water bodies encompass typical fertilisation rates for different crops, digital elevation map and watershed shapefile.

Results

Farmers' future adoption of AEM

- Based on interviews and an experimental survey conducted in Bačka in 2020 and 2021, we found that farmers' willingness to adopt measures is to a great degree influenced by economic considerations. Farmers are unlikely to trade the productive land for environmental payments, and they will rather choose AEM that fit to their agricultural practice or AEM that are easy to implement (Bartkowski et al. 2023). Simulation of farmers' adoption of AEM additionally confirms it (high payments increase the adoption rate; see Fig. 4). Also, it shows that the most favourable AEM among farmers would be: cover crops and flower strips (Fig. 4), which fit best to the prevailing agricultural practice in Bačka.

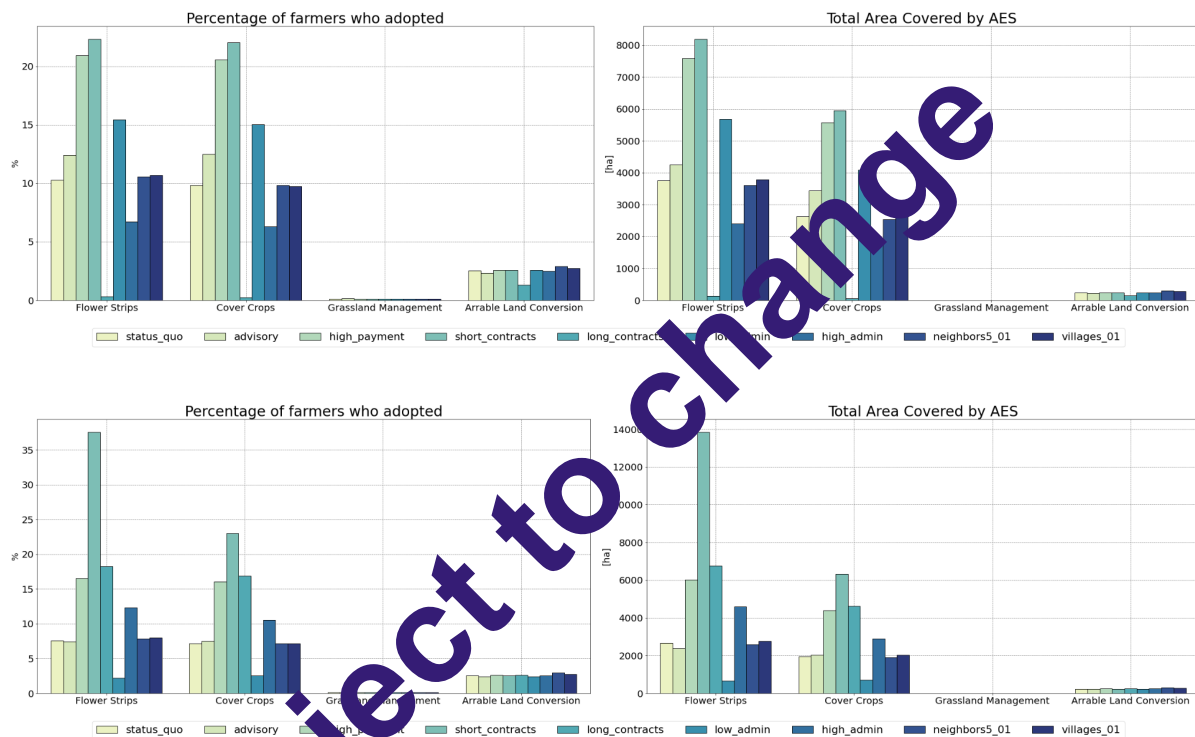


Figure 4: Adoption rates and total area covered of selected AEM at the farm level for different policy scenarios, when expected payment levels were used from the literature (top right and left) or rely on survey results (bottom right and left)

- The design of AEM is an important consideration, and several aspects in particular. Contract duration stands out as the most important (Fig. 4). This is explained by the fact that most farmers use land that is at least partially leased, and tenure contracts are normally short-term. Bureaucratic load is an additional important factor that can discourage farmers from adopting AEM (Fig. 4), especially relevant if considering large numbers of small farmers (a burden with previous applications for the IPARD programme has been highlighted in the interviews). Still, a certain amount of administration can be a sign of transparency for those with less confidence in the fairness of the current agricultural politics. Fig. 4 suggests that advisory services are of somewhat lower importance, but the manner in which they are implemented (who provides, how and what type of information) is perhaps more important to consider (Bartkowski et al. 2023).
- Generally, Serbian farmers show low trust in policy and administration, which may turn them away from even considering an application for AEM (Bartkowski et al. 2023).

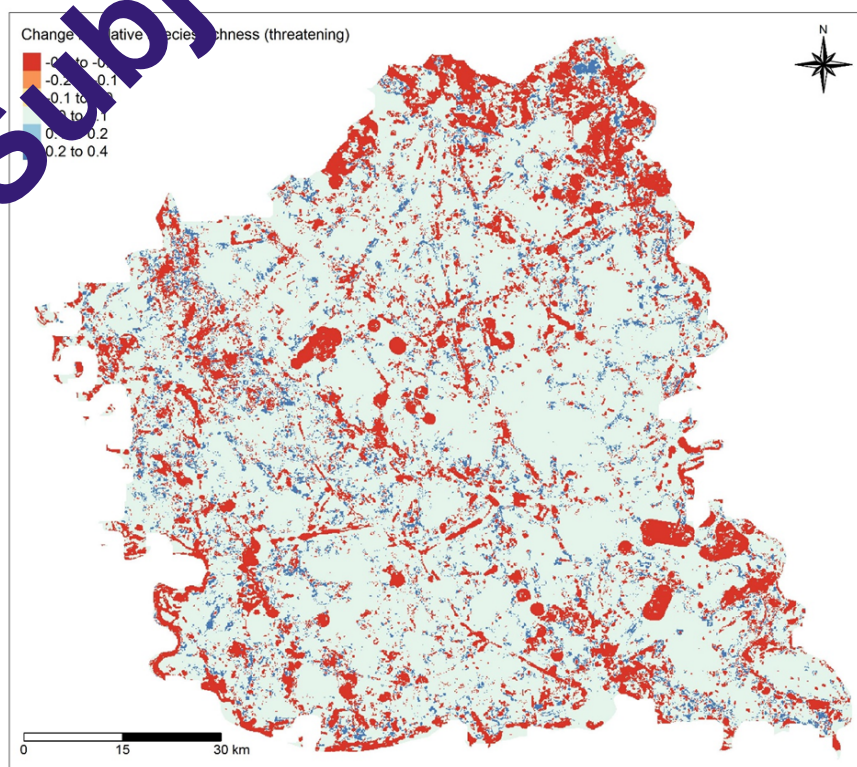
The impact of AEM on biodiversity and ecosystem services

Since AEM are still not implemented in Serbia, our goal was to evaluate what role non-agricultural vegetation (grasslands 1.8%, fallow land 1.4%, linear elements 1.8%) that farmers keep on their land without any financial support has on the environment. The results show that:

- There is a significant difference in biodiversity outcomes between the current scenario, in which non-agricultural vegetation (denoted as “surrogate” measures) is preserved, and the scenario in which these semi-natural elements are removed from

the agricultural landscape (Fig. 5 top). When results are aggregated across all examined species, removal of semi-natural elements (threatening scenario) leads to a 26% decrease in mean species richness. Hence, vegetation elements across agricultural parcels are currently preserving biodiversity and thus have a positive effect.

- The most beneficial landscape features are grasslands and linear elements (i.e. flower strips), along with crop diversity, at both local and landscape scale (Cord et al. 2022).
- Besides the loss of suitable habitats for biodiversity, if examined land with non-agricultural vegetation is converted to agriculture with average fertilisation rates this could lead to increase of catchment release for 1637 t of nitrogen and 977.08 t of phosphorus into water bodies and thus further reduce the water quality.
- ABM scenarios for AEM acceptances were evaluated with biodiversity models and potential positive effects were quantified. For example, a high-payment scenario, where grasslands maintenance was the most accepted, jointly with other accepted AEM it would bring the relative improvement of 6.43% (Fig. 5 bottom). In contrast, the status quo scenario would bring only 3.67% improvement. Implementation of these scenarios could reduce the export of nitrogen and phosphorus into water bodies for 467 t and 279.2 t in the high-payment scenario, and 35 t and 20.5 t in status quo.



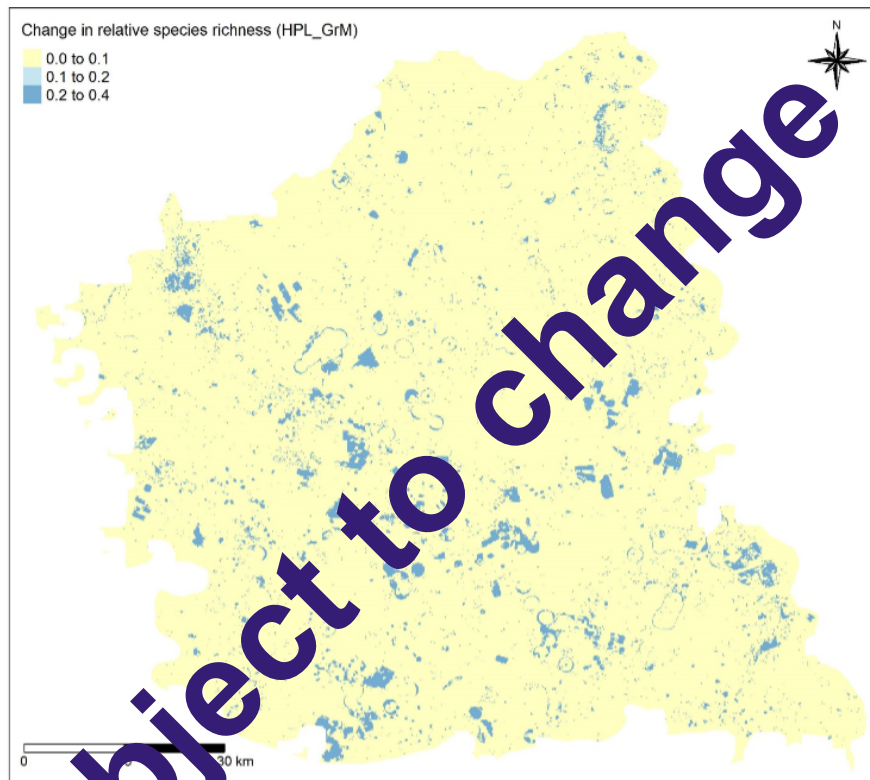


Figure 5: (top) Evidence of loss of suitable habitats in a threatening scenario where all semi-natural elements are converted into arable land. Remnants of suitable habitats remain scattered only within formally protected area lands (areas dedicated to nature conservation). (bottom) Predicted improvement of the suitable habitats with AEM acceptance obtained in high-payment scenarios.

Recommendations

To succeed in the future adoption of AEM by farmers, we recommend the following:

- Considering farmers' inexperience with AEM and still unfavourable economic conditions, the most reasonable choice would be measures that fit to local agricultural practices, that are not technically too demanding and will not adversely affect farmers' income. Cover crops and flower strips are such examples (the most preferred option among farmers in our study). Additionally, hidden costs in complicated application procedures should be solved to support farmers, especially those with lower financial and administrative capacities. Providing a trustworthy support for uptaking new practices may help raise their interest and eventually, build more trust in the policy.
- Particular attention should be given to finding solutions for long-term contracts, as short-term contracts or insecure terms of contracts can seriously affect farmers' uptake of future AEM. Moreover, long-term contracts will ensure ecological effectiveness of AEM.

To ensure the positive impact of future AEM on biodiversity and ecosystem services, we recommend the following:

- Support farmers in Vojvodina to preserve existing non-agricultural vegetation elements across agricultural parcels as these already have a positive effect on biodiversity. From a long-term perspective, to increase the positive effect, expansion of such areas will be necessary, which may also entail the introduction of AEM on

productive lands. Still, for such decisions (where exactly to implement specific AEM and how much land it will be needed), it is first necessary to set clear conservation goals in agricultural settings.

- Grassland areas, in particular, seem to be beneficial for biodiversity. Since our results show the lowest interest of farmers in Bačka for grassland maintenance and mainly accepted under higher payment incentive, it may be that alternative solutions to preserve such areas will be necessary.

Technical considerations

- While our BESTMAP experience confirms that policy impact assessment tools can be extremely useful in the planning process, scarcity of data that can be used for that purpose was a challenging part. Therefore, we recommend cross-institutional cooperation (between public institutions, academic institutions, NGOs) in building databases to be used for this type of purposes.
- With e-Agrar (electronic registration of farming households introduced in 2023) efficient usage of data and automation of the processing of agricultural subsidies' requests will be accomplished. Further upgrades of e-Agrar with LPIS (Land Parcel Identification System) will provide necessary farm level data to run BESTMAP framework on more comprehensive data.
- Finally, even though learning from the experience of other countries is always useful, each case is specific, and applying the same solution (e.g. the type of agricultural practice or design of AEM) in two different countries can have quite the opposite effect. The same would apply for two different regions within a country. For this reason, careful consideration of the future AEM design supported by predictions from modelling tools is recommended.

References

- Bartkowski, B., Beckmann, M., Bednář, M., Biffi, S., Domingo-Marimon, C., Mesaroš, M., Schüßler, C., Šarapatka, B., Tarčak, S., Václavík, T., Ziv, G., Wittstock, F. (2023): Adoption and potential of agri-environmental schemes in Europe: Cross-regional evidence from interviews with farmers. Submitted to *People and Nature*.
- Václavík, T., Čejka, T., Bednář, M., Will, M., Roilo, S., Beckmann, M., Paulus, A., Schneider, K., Bartkowski, B., Grujić, N., Brdar, S., Lugonja, P., Domingo-Marimon, C., Broekman, A., Wool, R., Gosal, A., Li, C., Breckenridge, G., Gunning, J. & Ziv, G. (2023). Systematic analysis of the case studies. Deliverable D4.4 EU Horizon 2020 BESTMAP Project, Grant agreement No. 817501.
- Cord, A., Roilo, S., Beckmann, M., Paulus, A., Schneider, K., Lugonja, P., Nikolic, T., Langerwisch, F., Bednář, M., Václavík, T., Evans, P., Gosal, A., Wool, R., Breckenridge, G., Gunning, J. & Ziv, G. (2022). ESS, biodiversity and socio-economic models for each case study. Deliverable D3.3 EU Horizon 2020 BESTMAP Project, Grant agreement No. 817501.
- Sharp, R., Douglass, J., Wolny, S., Arkema, K., Bernhardt, J., Bierbower, W., ... & Wyatt, K. (2020). InVEST 3.8. 7. User's Guide. The Natural Capital Project, Stanford University, University of Minnesota, The Nature Conservancy, and World Wildlife Fund: Stanford, CA, USA.

About the authors

Sonja Tarčak is a researcher at BioSense Institute in the field of ecosystem ecology, management and governance (sonja.tarcak@biosense.rs); Tijana Nikolić Lugonja is a researcher at BioSense Institute in the field of ecosystem ecology, management and modelling (tijana.nikolic@biosense.rs); Predrag Lugonja is a researcher at BioSense Institute in the field of remote sensing and biophysical modelling (lugonjap@biosense.rs); Miljana Marković is a researcher at BioSense Institute in the field of remote sensing and biophysical modelling (miljana.markovic@biosense.rs); Nastasija Grujić is a researcher

at BioSense Institute in the field of agent based modelling (n.grujic@biosense.rs); Sanja Brdar is a researcher at BioSense Institute in the field of data fusion, machine learning and explainable AI (sanja.brdar@biosense.rs).

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Subject to change

Figure 7: Policy note – Catalonia – ES Case study

Evaluation of effectiveness of agri-environmental practices (AEP) in Catalunya: Recommendations from the European BESTMAP project

Authors Cristina Domingo, Joan Masó, Guy Ziv

Introductory paragraph / Executive summary

This policy brief summarises the research outputs of the BESTMAP project, which investigated the impact of agri-environmental practices (AEP), an umbrella term including agri-environmental schemes and ecological focus areas (CAP 2014-2022) in Catalunya. BESTMAP provides information on farmers' motivations for adopting an AEP, on the spatial distribution and extent of AEPs, and on the impacts of AEPs on biodiversity and ecosystem services. The resulting recommendations are directed to policymakers in Catalonia, as well as to agricultural labour unions, cooperatives and environmental organisations.

Policy context

The European Common Agricultural Policy (CAP) supports the livelihood of 11 million farmers while maintaining environmental standards and good agricultural practices over half of the European Union (EU). In Spain, national, regional and local authorities, environmental and climate authorities, economic and social partners and organisations representing civil society, among others define de AEP. On the one hand, the income support and sectoral measures are considered of a national nature and have been defined in collaboration with the Autonomous Communities, such as the Department of Climate Action, Food and Rural Agenda (DACAA) of Catalunya. On the other hand, most rural development measures have a sub-national vocation and are designed by the Autonomous Communities, which have better awareness of the reality and needs of their territories. Moreover, in the definition of sub-national measures, the Autonomous Communities have provided a coordinated response to the needs identified in the national territory. The evaluation of policy instruments and their outcomes at regional and local levels is thus especially helpful for local stakeholders to inform their future decisions and develop sub-nationally-targeted solutions towards a more sustainable agriculture. This policy brief aims at suggesting recommendations to design Catalan policies for both, the next CAP funding period from 2028 onwards, and also for improvements of the current programme period 2023-2027.

Research goals

Catalonia covers an area of 32 000 km² in the north-eastern part of Spain, and 40% of the land is dedicated to agriculture. While the average climate is Mediterranean, the area presents a heterogeneous topography resulting in a variety of climatic zones ranging from Alpine, through continental Mediterranean, to coastal Mediterranean.

BESTMAP modelled water quality, carbon sequestration, food and fodder production and a biodiversity indicator (based on farmland birds' relative species richness) under different AEP adoption scenarios in Catalonia and for different farming system archetypes FSA.

What types of farms adopt agri-environmental practices?

From the Land Parcel Identification System (LPIS) database, a classification of farms, the so-called farming system archetypes (FSA), was created on the basis of economic size (< 2000 EUR, small, medium, large) and production focus (P1 General cropping, P2 Horticulture, P3 Permanent crops, P4 Livestock grazing, Mixed) according to the simplified Farm Accountancy Data Network (FADN) methodology. The spatial analysis revealed that:

- The area is dominated by large economic size farms, are also influenced by climatic zones, presenting predominant general cropping (barley, wheat) in the central part of the region, significant production of grazing livestock and forage in the north, while permanent crops are mainly located in the western plains.
- Larger farms are more likely to implement AEP which include cover crop related practices such as maintaining natural vegetation between lines of permanent crops (in Catalunya double cropping cycle based on cereal and leguminous plantation is considered fodder instead of cover crop).
- Organic farming is found in all farm specializations, specially those medium to large size.
- Farms not applying any of the AEPs are in most cases of small economic size.
- General cropping farms are less likely to apply several AEP.

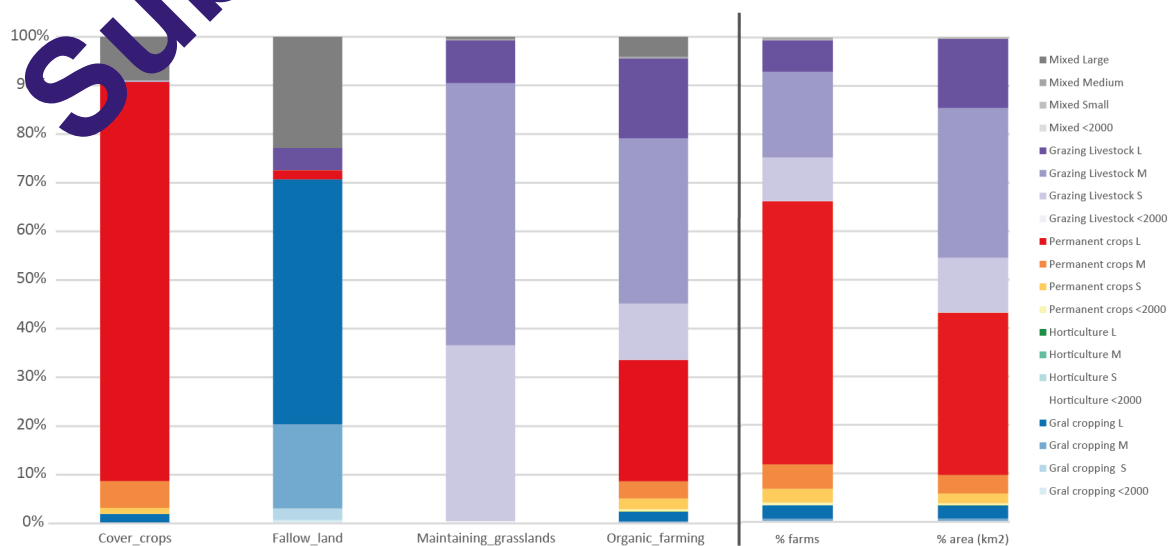


Figure 1: Use of selected agri-environmental approaches (AEPs) across different farms.

Why farmers adopt agri-environmental approaches?

Additional results based on structured farmer's interviews conducted in 2020 (47 interviews) indicate that (Bartkowski B *et al.* 2023):

- The main motivation for farmers to adopt an AEP is the economic compensation for lost profits and income diversification and reorientation of the business to create added value of the products and adapt to new market demands. The environmental impact of farming is a secondary reason.

- Farmers tend to apply only those practices that are consistent with their established farming practices.
- Farmers consider that there is a strong advisory system in place.
- Farmers are generally convinced of the ecological benefits of AEP, although question the specific design and effectiveness of some schemes.
- According to farmers, the main obstacles to greater application of AEP are:
 - AEP requirements are too different from the family traditional business model of the farm and therefore, there is more resistance towards change
 - Payments are too low to transform current practices, given the risk and uncertainty regarding yield losses
 - Bureaucratic burden is currently delegated to agency or advisory bodies, but is considerable.
 - Schemes are inflexible

What is the impact of AEP on biodiversity and ecosystem services?

Outcomes from different spatially-explicit models based on both socio-economic and environmental data developed by BESTMAP, which compare the current scenario of AEP adoption and an imaginary scenario where no AEPs exist, indicate that the current levels of AEP adoption lead to improvements mainly in biodiversity and soil organic carbon (Fig. 2; D4.4). The positive effect of AEP on biodiversity is equally distributed across different farming system phenotypes (Fig. 2), and the impact on specific bird species is also identified (Fig.3). Similarly, the positive changes in the soil organic carbon content are more significant for general cropping areas and livestock farms. The changes in standard output and in the export of nutrients (nitrogen and phosphorus - indicators of water quality) are positive (decrease in nutrients), albeit to a small extent.

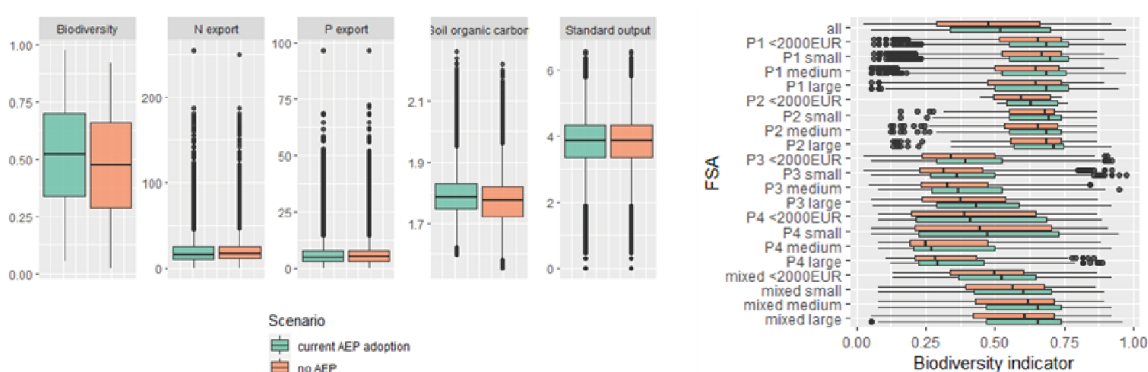


Figure 2: (Left) Comparison of farm-level values in ecosystem services' provision and biodiversity in Catalonia for the current AEP adoption scenario (green), and a scenario without AEP (orange). (Right) Value of the biodiversity indicator (a relative species richness index for farmland bird species ranging from 0 to 1) per FSA type and 2 scenarios (Farm specialization: P1 General Cropping; P2 Horticulture, P3 Permanent crops P4 Grazing Livestock, Mixed / Farm economic size: < 2000 EUR, small, medium, large).

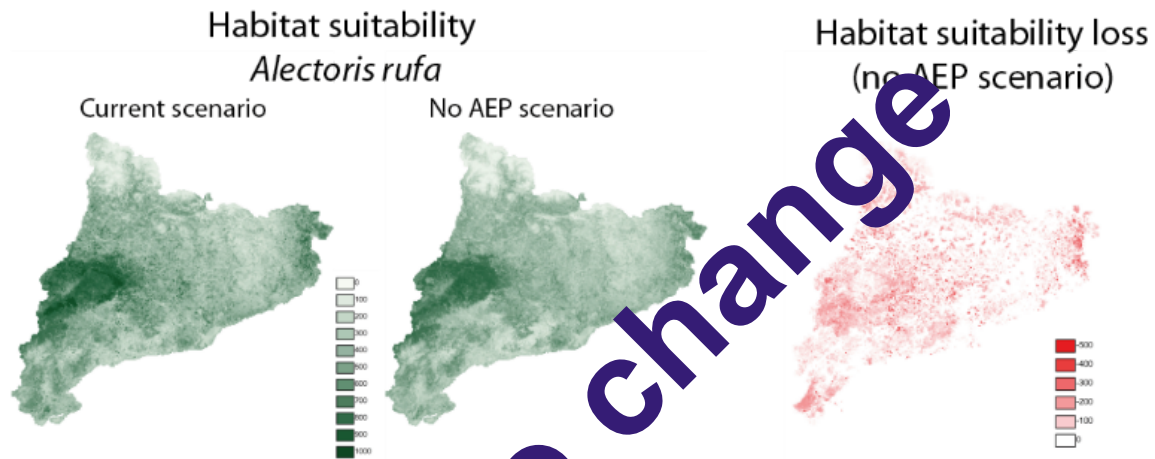


Figure 3: Modelled habitat suitability of *Alectoris rufa* (left panel; dark green indicates highly suitable areas, white indicates unsuitable areas) for the current and no AEP scenario; and habitat suitability loss (right panel, red indicates loss of habitat suitability, white indicates no change), calculated as the difference between the two scenarios.

What recommendations can be made for the future design of AEP in Catalunya?

Based on information from farmers and analyses of environmental and socio-economic data, and in order to increase the effectiveness of AEP, the following is recommended:

- Implementation of practices should be reinforced to increase the benefits, especially in small farms (e.g. these can act as barriers / connectivity corridors for biodiversity).
- More measures towards maintaining buffer strips and margins should be implemented, since these have been demonstrated as an effective measure for N/P export reduction in other case studies (D3.3).
- **Sub-regional environmental objectives to be achieved through AEP should be clearly defined.** For example, setting minimum goals for biodiversity conservation and ecosystem service provision for specific landscapes or regions is essential to determine which AEP needs to be implemented and where. Depending on the region, different environmental objectives may be prioritised.
- **Spatially distributed and tailored AEP according to environmental objectives should be implemented.** In complex landscapes with high levels of biodiversity and ecosystem services, measures should be implemented to encourage farmers to maintain, rather than to change, existing extensive land-use practices. In simple, more intensively used landscapes, AEP that require a change in farming practices to restore the level of ecological and landscape complexity should be offered.

In order to increase the uptake of AEP by farmers, we recommend the following:

- AEP requirements towards shorter or more flexible contracts and higher levels of financial support should be improved. This would work better in improving farmers' adoption rates than offering free advice and reducing bureaucracy burden.
- **Transparency should be increased by clearly communicating the objectives and ecological outcomes of AEP.** This can help increase farmers' willingness to

participate in the AEP, whose design and ecological effectiveness are sometimes questioned by farmers.

References and Additional sources of information

Bartkowski B et al. 2023. Adoption and potential of agri-environmental schemes in Europe: Cross-regional evidence from interviews with farmers. *People and Nature* (in review).

Cord, A., Roilo, S., Beckmann, M., Paulus, A., Schneider, K., Lugonja, P., Nikolic, T., Langerwisch, F., Bednář, M., Václavík, T., Evans, P., Gosal, A., Wool, R., Breckenridge, G., Gunning, J. & Ziv, G. (2022). ESS, biodiversity and socio-economic models for each case study. Deliverable D3.3 EU Horizon 2020 BESTMAP Project, Grant agreement No. 817501.

Paulus, A., Hagemann, N., Baaken, M.C., Roilo, S., Alarcón-Segura, V., Cord, A.F., Beckmann, M. (2022): Landscape context and farm characteristics are key to farmers' adoption of agri-environmental schemes. *Land Use Policy* 121. <https://doi.org/10.1016/j.landusepol.2022.106320>.

Roilo, S., Engler, J.O., Václavík, T., Cord, A.F. (2023): Landscape-Level Heterogeneity of Agri-Environment Measures Improves Habitat Suitability for Farmland Birds. *Ecological Applications* 33(1). <https://doi.org/10.1002/eap.2720>.

Václavík T, Čejka T, Bednář M, Will M, Roilo S, Beckmann M, Paulus A, Schneider K, Bartkowski B, Grujić N, Brdar S, Lugonja P, Domingo-Marimon C, Broekman A, Wool R, Gosal A, Li C, Breckenridge G, Gunning J & Ziv G. 2023. Systematic analysis of the case studies. Deliverable D4.4 EU Horizon 2020 BESTMAP Project, Grant agreement No. 817501.

PROJECT DETAILS

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About the authors

Cristina Domingo-Marimon, Researcher at CREAM, cristina.domingo@uab.cat

Joan Masó, Researcher at CREAM, joan.maso@uab.cat

Guy Ziv, Chair in Socio-Environmental Systems / Director of Research and Innovation for SoG, School of Geography, University of Leeds g.ziv@leeds.ac.uk

CONSORTIUM

13 partners from 8 European countries

DURATION

September 2019 – February 2024

WEB Bestmap.eu

TWITTER @Bestmap_EU

FACEBOOK @BestmapEU

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Subject to change

4. Appendices

Annex 1 - Document provided to interviewees



GUIDE TO THE PHONE INTERVIEW

What is BESTMAP?

BESTMAP is a H2020 Project which will design and develop a new Policy Impact Assessment Model (PIAM) framework which will integrate modern socio-economic, behavioural and biophysical approaches that will capture the environmental, social and economic variability of individual farms and EU regions. The model will eventually be used by European policy makers in the European Commission and at the Member State level to model the outcomes of possible policy measures. It is envisioned as a tool to complement, extend and integrate with existing models used by the Commission and Joint Research Centre (JRC).

Why are we carrying out phone interviews?

To ensure the relevance of the model, it will be co-designed. By this we mean we will use feedback from a co-design workshop with DG AGRI later this year, as well as interviews (like this one) collecting experiences from EU institutions, national, regional and local decision-makers, expert personnel and other researchers as well as practitioners engaged in the food chain.

Who are we contacting for the questionnaire?

For the purpose of this questionnaire, we will be contacting stakeholder representatives at the European level – farmer organisations, industry representatives (input suppliers, processors, retailers) and NGOs (environment, animal welfare and health).

Background

The Green Deal has clearly established the European Union's intention that the EU should support and lead a global transition to a sustainable food system. There are now multiple objectives for our land use such as increasing the share of land used for carbon sequestration (including afforestation), for biodiversity and for the production of biomass for renewable energy. This needs to be done alongside the reduction of synthetic inputs, improving water quality, protecting soil health and building resilient systems to mitigate and adapt to climate change. On top of this we need to tackle food waste, and consumers are being urged to eat less livestock products, leading to predictions that more plant proteins will need to be grown.

To enable this, the Commission will have to work with Member States to ensure that these objectives are effectively translated into policy measures including ensuring that the post 2020 CAP national strategic plans adhere to a concerted and ambitious plan in line with these aims.

Through this questionnaire, we would like to get your feedback on where your members think the priorities for this sustainable system should be, the greatest challenges, trade-offs and what will drive the food chain, and consumers, to meet these objectives. The BESTMAP project focuses on changes to the land system (mostly agriculture and husbandry) driven by policy change, in particular of the CAP – but we welcome comments on other aspects (e.g. trade, diet) if you think these are more prominent issues.

The Interview

The interview process will last up to and no longer than 45 minutes and will consist of an informal conversation structured according to the questions below. The interview will be recorded in order to keep a transcript unless you object to it. The recording will be kept in a GDPR compliant storage of BESTMAP.

Attributing quotes/confidentiality

We will acknowledge your involvement in the interview process; however, we will not attribute quotes or specific points of view to you.

Introduction

- Brief introduction to the BESTMAP project by the interviewer
- Short description of yourself and current work, and interest in specific policy areas

Questions:

Bloc 1. Priorities, drivers and trade-offs

1. From your perspective, what do you consider will be the most significant trend in EU agriculture and food production in the next 5, 10- and 30-years' time?
2. The multiple aims mentioned in the introduction will inevitably lead to trade-offs and priorities. Are there any aspects that concern you and where do you see the major challenges and trade-offs?
3. What do you envisage will be the key drivers to make the change the Green Deal is aiming for happen (at the European level and, if you have particular knowledge of certain Member States, giving examples at the MS level).

-
4. Is our current policy framework adequate to meet these challenges? Is it a question of the better implementation of current policy, or do we need to adjust our current policy framework?

- If you believe we need to adjust our current policy framework, what set of policies do you believe need to be put in place?

- If you believe it is a matter of the more effective implementation of current policy, what do you think can enable this?

5. ** Do you think the methodology for impact assessments of future CAP reforms (or other European objectives that will impact land use) needs to be improved, and if so, why and how? For example, are there important aspects that should be taken into consideration in the impact assessment that are currently missing?*

**If this question is out of the scope of your focus of expertise, is there someone in your organisation that may be able to address this question?*

Subject to change

Annex 2 - The scoping document form

Title of the policy brief	Title that will be used to refer to the brief for the names/internal communications. 1-3 words.
Authors	Please also include affiliation and name
Goal	What do you want to achieve by doing this brief? How will you know if you have succeeded? Be as specific as possible.
Policy relevance / opportunity	What evidence do we have that this topic is relevant for policy right now? E.g. recent announcements, strategies, government targets, inquiries, upcoming legislation etc. What part of the policy process are current discussions, is there an opportunity to influence things?
Target audiences	Who will we look to send the brief to once it is complete? Please list the individuals, groups or organisations that should be targeted. For groups/organisations, if possible identify an individual who will be the contact point. Prioritise this list: who are the core targets, and which are the groups who might be interested but are lower priority? For core audiences, the aim should be to contact them directly where possible. Lower priority audiences might be targeted in other ways, e.g. via social media.
Key messages	What are the key take home messages i.e. what 3 main things do you want them to remember once they have put the brief down? We will use this to check that these messages stand out in the final brief.
Timing	When does the brief need to be completed by? Does this take into account timing of upcoming policy activities (e.g. policy meetings, reviews, etc.)?
Evaluation	How will you know if the brief has done its job? What indicators could you track to measure engagement or impact? When will these indicators be likely to occur, in the short, mid- or long-term? (where short is under a month and long over a year)

Annex 3 - Policy note of the Czech case study in the professional template

**BESTMAP**BEHAVIOUR, ECOLOGICAL AND
SOCIO-ECONOMIC TOOLS FOR
MODELING AGRICULTURAL POLICY

Agroenvironmentální přístupy v zemědělské krajině: závěry a doporučení z evropského projektu BESTMAP

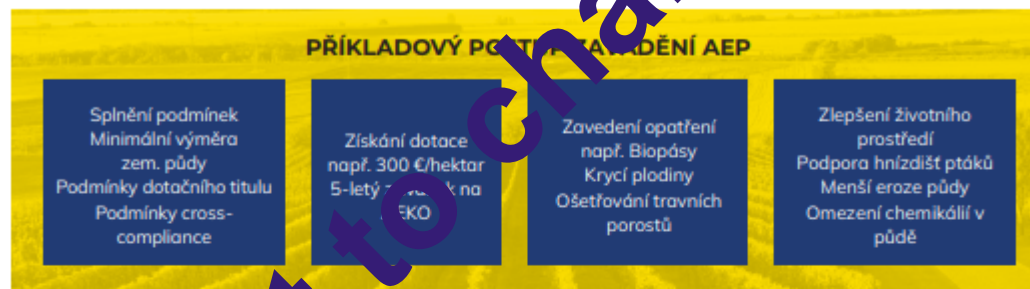
AUTOŘI: Tomáš Václavík, Tomáš Čejka, Marek Bednář, Bořivoj Šarapatka



Tento projekt je financován z Rámcového programu pro výzkum a inovace Evropské unie Horizont 2020 na základě grantové dohody č. 817501.



Populační růst a konzumní způsob života vedou ke zvyšování nároků na stabilní produkci potravin. Intenzivní využívání zemědělské půdy má však i řadu negativních vlivů na životní prostředí. Z toho důvodu se v zemědělství využívají agroenvironmentální přístupy (zkráceně AEP), které zvyšují udržitelnost a polyfunkčnost zemědělské krajiny. Mezi nástroje, které jsou součástí Společné zemědělské politiky EU, patří především agroenvironmentálně-klimatická opatření (AEKO), platby za ozelenění, např. plochy v ekologickém zájmu (tzv. EFA) nebo ekologické zemědělství.



Cílem projektu BESTMAP bylo vypracovat metodický rámec pro modelování dopadu zemědělských politik (především AEP) na zemědělskou krajinu. Metody projektu zohledňují složitost rozhodování zemědělců a rozdílné preference jednotlivých typů zemědělských podniků. Zároveň projekt hodnotí dopad různých scénářů implementace AEP na biodiverzitu a ekosystémové služby v případovém území Jihomoravského a Zlínského kraje. Konkrétně jsme se snažili zodpovědět následující otázky:

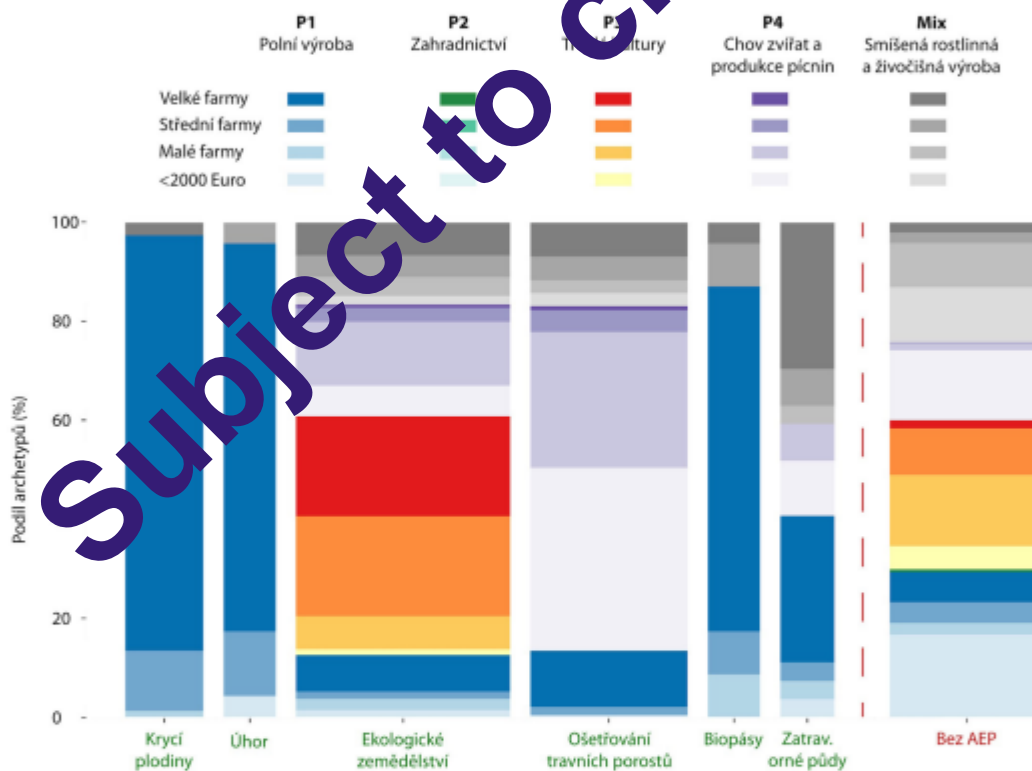


Jaké typy farem využívají agroenvironmentální přístupy?

Z databáze evidence půdy na uživatele – LPIS (angl. Land Parcel Identification System) byla na základě ekonomické velikosti a výrobního zaměření podle zjednodušené metodiky FADN (angl. Farm accountancy data network) vytvořena klasifikace zemědělských podniků, tzv. faremní archetypy (angl. Farming system archetypes). Prostorovou analýzou faremních archetypů a dat Ministerstva zemědělství o využívání dotačních titulů bylo zjištěno, že:

- Z hlediska celkového počtu farem je 28 % zaměřeno na polní výrobu (P1), 32 % na trvalé kultury (P3), 23 % na chov zvířat a produkci píce (P4), 16 % na smíšenou rostlinnou a živočišnou výrobu (mix), a <1 % na zahradnictví (P2). Farmy P1 jsou typicky velké z hlediska ekonomické velikosti; farmy P3 a smíšené farmy jsou rovnoměrněji rozděleny mezi všechny třídy ekonomické velikosti; farmy P4 jsou většinou malé farmy.
- Naprostou většinu zemědělské plochy (78 %) obhospodařují ekonomicky velké podniky zaměřené na polní výrobu (P1).
- Velké podniky častěji využívají AEP a zároveň implementují širší portfolio opatření, zatímco malé farmy využívají AEP méně častěji a soustředí se na několik málo typů opatření.
- Vyšší využívání agro-envi programů je u farem zaměřených na živočišnou výrobu (77 %) a trvalé kultury (61 %). Nejnižší podíl AEP je u podniků zaměřených na polní výrobu (19 %).

- Některé typy AEP (např. biopásy, krycí plodiny a úhor) jsou využívány primárně velkými podniky zaměřenými na polní či smíšenou výrobu, zatímco ošetřování travních porostů a ekologické zemědělství je častější u středních a malých farem, zaměřených na živočišnou výrobu a trvalé kultury (Obr. 1).
- Ekologická produkce se vyskytuje u všech faremních archetypů (Obr. 1), ale farmy nepodávající v režimu ekologického zemědělství méně častěji využívají další agroenvironmentální nástroje (AEKO, EFA) ve srovnání s konvenčními podniky.
- Farmy nevyužívající žádný z AEP jsou ve většině případů malé podniky střední velikosti (Obr. 1).



Obrázek 1: Využití vybraných agroenvironmentálních přístupů (AEP) napříč různými typy farem.



Proč zemědělci (ne)využívají agroenvironmentální přístupy?





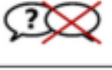
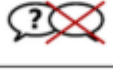
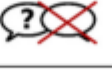
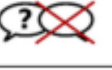




Na základě strukturovaných pohovorů a dotazníkových průzkumů mezi zemědělci zavedených v období 2020–2022, doplněných o výsledky multi-agentních modelů pro rozhodování, jsme zjistili že:

- Hlavní motivací zemědělců zavádět AEP je ekonomická kompenzace ušlého zisku a diverzifikace příjmů. Dopad zemědělského hospodaření na životní prostředí je další, ale méně důležitým důvodem. Ekonomický přínos AEP je významnější pro konvenční zemědělské podniky, než pro biozemědělce.
- Farmáři mají tendenci aplikovat pouze ty AEP, které jsou v souladu s jejich zavedenými zemědělskými postupy.
- Informovanost ohledně zavádění AEP je dobrá, ale zemědělci kritizují velkou byrokratickou zátěž, která kvůli absenci administrativních kapacit omezuje využití větší farmy.
- Motivace zemědělců do značné míry souvisí s délkou trvání podpory. U opatření na trvalých travních porostech by farmáři preferovali delší závazky, zatímco u opatření na orné půdě preferují kratší či flexibilnější závazky. Dlouhodobá opatření jsou upřednostňována za předpokladu, že zemědělci mají dlouhodobé nájemní smlouvy (80 % zemědělců hospodářských majatelů zemědělské půdě, zatímco pouze 20 % je vlastníky).
- Hlavní překážky pro větší využívání AEP jsou podle zemědělců:

Nedostatečná finanční kompenzace za ztížené hospodaření

Striktní podmínky jednotlivých opatření (např. minimální výměra, fixně stanovené termíny seče či pastvy)

Přesahující byrokratická zátěž

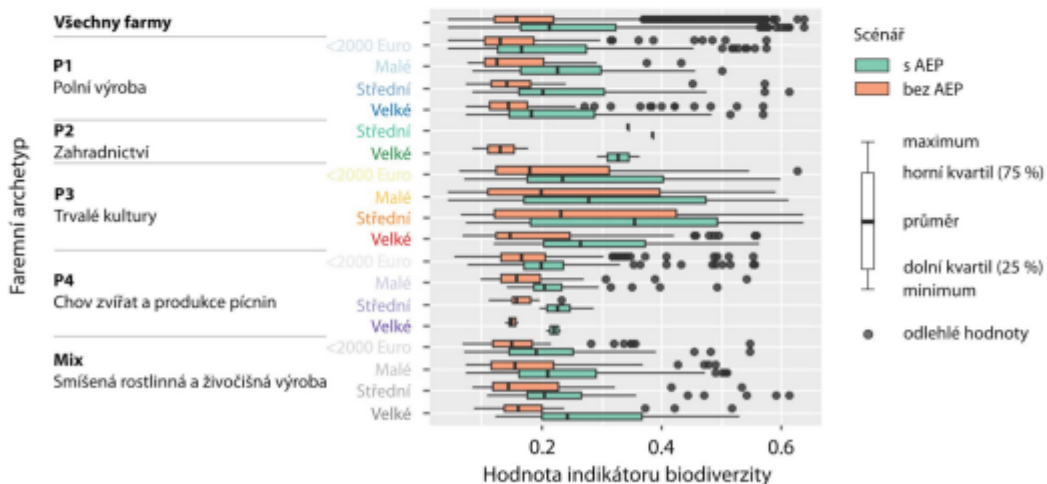
	Květnaté plochy/biopásy	Krycí plodiny	Ošetřování travních porostů	Zatrávňování orné půdy	Bez opatření
Doba trvání smlouvy	1 rok 	5 roků 	5 roků 	5 roků 	Na vaší farmě byste neobdrželi žádnou finanční podporu související s agroenvironmentálními programy.
Poradenství	Ne 	Ne 	Ne 	Ne 	
Administrativní zátěž	Střední 	Střední 	Střední 	Nízká 	
Roční platba	675 EUR/ha	75 EUR/ha	215 EUR/ha	1200 EUR/ha	

Obrázek 2: Ukázka části dotazníkového šetření (září 2021 – duben 2022), kde farmáři na základě svých preferencí vybírali z několika hypotetických nastavení AEP.

Jaký je dopad AEP na biodiverzitu a ekosystémové služby

Na základě dat o krajinné struktuře, klimatických a půdních parametrech, pěstovaných plodinách a charakteristikách podniků a jejich hospodaření byly vytvořeny bio-fyzikální modely pro biodiverzitu (stanoviště polních ptáků) a tři vybrané ekosystémové služby: (1) standardní zemědělská produkce, (2) množství živin v povrchových vodách a (3) množství organického uhlíku v půdě. Pomocí těchto modelů byl hodnocen vliv AEP na životní prostředí a porovnány scénáře různé implementace agroenvironmentálních opatření. Výsledky nazývají, že:

- AEP zvyšují kvalitu stanovišť indikátorových taxonomických skupin (např. polních ptáků) v zemědělské krajině (Obr. 3). Míra pozitivního vlivu závisí na typu AEP, jednotlivých druzích a prostorovém měřítku.
- Spíše než konkrétní opatření v místě výskytu daného druhu je důležitější propojenost stanovišť přírodě blízkými prvky v širším krajinném měřítku (v okolí alespoň 1 km). To platí hlavně u opatření na orné půdě; na trvalých travních porostech je významný i lokální kontext jednotlivých opatření.
- Vliv AEP na biodiverzitu je pozitivní, ale slabý. Současná míra implementace AEP, pokrývající v průměru méně než 5 % výměry zemědělské půdy, je příliš malá na to, aby měla signifikantní vliv na biodiverzitu.
- Používání AEP vede k mírnému snížení standardní produkce u většiny opatření a typů farem, zvláště farem zaměřených na chov zvířat a smíšenou výrobu.
- Zavedení AEP má také pozitivní vliv na kvalitu povrchových vod, jelikož vede ke snížení exportu dusíku (N) a fosforu (P) do vodních zdrojů, opět zvláště u farem zaměřených na živočišnou a smíšenou produkci.
- AEP také v průměru zvyšují podíl organického uhlíku v půdě u všech faremních archetypů, v závislosti na konkrétním opatření, pěstovaných plodinách a intenzitě hospodaření.



Obrázek 3: Vliv AEP na kvalitu stanovišť polních ptáků – porovnání současného stavu AEP se scénářem simulujícím absenci AEP na zemědělské půdě na úrovni jednotlivých faremních archetypů.

Jaká doporučení lze vyvodit pro budoucí implementaci AEP v ČR?

Na základě informací od zemědělců, analýz environmentálních a socioekonomických údajů a vytvořených modelů, zohledňujících komplexnost rozhodování různých typů zemědělských subjektů, můžeme vyvodit následující.

Aby se zvýšila míra využívání AEP zemědělci, je žádoucí:

- Zvýšit míru finanční podpory tak, aby dostatečně kompenzovali zemědělcům ušlý zisk za ztížené hospodaření.
- Snížit míru byrokratické zátěže, která je hlavní překážkou při zavádění AEP hlavně u farem malé ekonomické velikosti.
- Zvýšit administrativní podporu a přístup k bezplatnému poradenství, které může pomoci se snížením byrokratické zátěže a se zakomponováním AEP do faremních plánů hospodaření.
- Zvýšit flexibilitu podmínek jednotlivých vazků AEP (např. délka smluv, požadavky na minimální výměru, termíny seče a pastvy) a stanovit limity hospodaření v souladu s místními podmínkami.
- Alokovat více financí na přírodní a nově vzniklá, flexibilnější "ekoschémata", která částečně přebírají funkci greeningu a AEKO.
- Jasně komunikovat o environmentálních přínosy AEP a tím pomoci zvýšit ochotu zemědělců zapojit se do programů, jejichž přínosy jsou zemědělcům často nejasné či nepřesvědčivé.



Aby se zvýšily přínosy AEP pro biodiverzitu a ekosystémové služby je žádoucí:

- Zvýšit celkovou výměru zavedených AEP, aby tvořily propojenější soustavu přírodních ekosystémů hospodaření na zemědělské půdě.
- Cílit na zvýšení procentuální výměry zavedených AEP u velkých podniků a zvýšením participace v agroenvi programech u malých farem.
- Nabízet široké portfolio různorodých opatření, jejichž implementací by se zajišťovala diverzifikovaný mix úkrytových stanovišť a potravních zdrojů pro různé taxonomické skupiny.
- Jasněji definovat předpokládané přínosy AEP pro biodiverzitu, např. definovat minimální cíle ochrany, které musí být splněny pro určité území, typ stanoviště nebo specifické druhy. Lepší prostorové nebo druhové zacílení zajistit pomocí opatření zaměřených na výsledky (angl. *results-based measures*).
- Jasněji definovat předpokládané přínosy AEP pro poskytování ekosystémových služeb, např. minimalizaci vyplavování živin v citlivých oblastech nebo udržování adekvátních vlastností půdy pro zajištění dlouhodobé produktivity. Stanovit, které typy AEP jsou vhodné pro konkrétní cíle.
- Zvážit možnost kooperativních schémat, zahrnujících společné zapojení sousedících farem např. za účelem propojení stanovišť nebo dosažení minimální požadované výměry AEP, což může podpořit efektivitu AEP v širším krajinném měřítku.

DALŠÍ ZDROJE INFORMACÍ

Václavík T, Čížka T, Bednář M, Will M, Roilo S, Beckmann M, Paulus A, Schneider K, Bartkowski B, Grujić N, Brdar S, Lugonja P, Domingo-Marimon C, Broekman A, Wool R, Gosal A, Li C, Breckenridge G, Gunning J & Ziv G. 2023. Systematic analysis of the case studies. Deliverable D4.4 EU Horizon 2020 BESTMAP Project, Grant agreement No. 817501.

Cord A, Roilo S, Beckmann M, Paulus A, Schneider K, Lugonja P, Nikolic T, Langerwisch F, Bednář M, Václavík T, Evans P, Gosal A, Wool R, Breckenridge G, Gunning J & Ziv G. 2022. ESS, biodiversity and socio-economic models for each case study. Deliverable D3.3 EU Horizon 2020 BESTMAP Project, Grant agreement No. 817501.

Bartkowski B et al. 2023. Adoption and potential of agri-environmental schemes in Europe: Cross-regional evidence from interviews with farmers. *People and Nature* (in review).

Roilo S, Engler JO, Václavík T, Cord AF. 2023. Landscape-Level Heterogeneity of Agri-Environment Measures Improves Habitat Suitability for Farmland Birds. *Ecological Applications* 33(1). <https://doi.org/10.1002/eap.2720>.

Wittstock F, Paulus A, Beckmann M, Hagemann N, Cornelia Baaken MC. 2022. Understanding farmers' decision-making on agri-environmental schemes. *Land Use Policy* 122. <https://doi.org/10.1016/j.landusepol.2022.106371>.

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KONTAKT

Katedra ekologie a ŽP, Přírodovědecká fakulta, Univerzita Palackého v Olomouci
doc. Tomáš Václavík, tomas.vaclavik@upol.cz, +420 585 634 555
prof. Bořivoj Šarapatka, borivoj.sarapatka@upol.cz, +420 585 634 530

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PODĚKOVÁNÍ

Tento dokument je výstupem spolupráce partnerů evropského projektu BESTMAP. Děkujeme nadaci RISE Foundation a The University of Leeds za podporu při přípravě a ověřování obsahu.



Annex 4 - Summary of the scoping document for each case study

	Humber Catchment – UK	Mulde River Basin – DE	South Moravia – CZ;	Baranja Region – RS	Catalonia - ES
Main target audiences	Department for Environment, Food & Rural Affairs (DEFRA) Rural Payments Agency	Agricultural Ministry of Saxony (SMEKUL) Environmental Agency of Saxony (LfULG)	Ministry of Agriculture Ministry of Environment Agency for Nature Conservation and Landscape Protection	Ministry of Agriculture, Forestry and Water management Ministry of environmental protection	DARP Labour unions for the agriculture sector in Catalonia
Policy relevance/ opportunity	Transitional time: new CS schemes will start in January 2024. Next general election will be before Jan 2025	Well in time for initial planning of new CAP 2028-2032 Just before parliamentary elections in Saxony 2024	National implementation of the current CAP 2023-2027 Before the initial planning of new CAP 2028-2032	2021-2027,. This is for the first time that agri-environmental measures are incorporated in the program	Regional evaluation of the current CAP 2023-2027 Recommendations for the initial planning of new CAP 2028-2032

<p>Means of evaluation</p>	<p>Engagement with stakeholders and updates. Inclusion of spatial targeting, which would likely occur over the long-term due to the complexities of knowing how/where to target.</p>	<p>Number of bilateral meetings following the dissemination of the brief Number of downloads, citations, and social media interactions.</p>	<p>Evaluation through direct engagement with target stakeholders meetings, committee participation, project collaborations.</p>	<p>Interest shown by relevant institutions on the BestMap project in further process. More activities in the direction of data collection and research on the topic.</p>	<p>Number of people reached, number of bilateral meetings, views on social media, number of citations of policy brief impact on implementation measures.</p>
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Subject to Change

[1] COMMISSION STAFF WORKING DOCUMENT STAKEHOLDER CONSULTATION - SYNOPSIS REPORT Accompanying the document Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Council Regulation (EC) No 1217/2009 as regards conversion of the Farm Accountancy Data Network into a Farm Sustainability Data Network SWD/2022/166 final