BESTMAP

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

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

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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, AEP 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 km^2, 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 AEP?

Based on interviews and questionnaires 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 farm holders 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 AEP (e.g. fixed mowing dates, minimum area requirements) also discourage farmers from participating in AEP, 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).

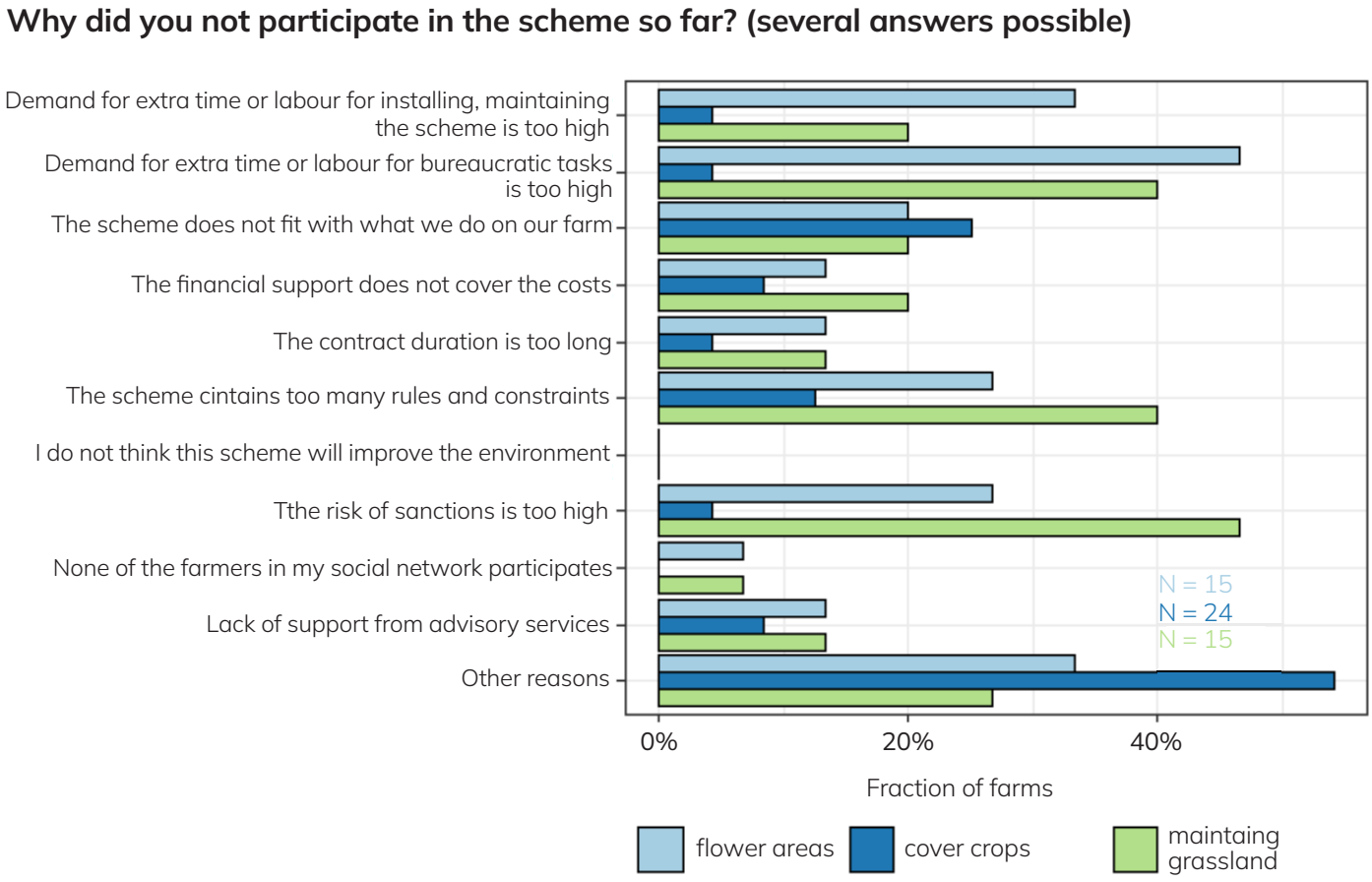

Figure 1: Results from the choice experiment directed at farmers in Saxony (N = 74, including only farmers who did not participate in AEP in the past), surveying their motivations for (not) participating in three types of AEP, namely flower areas, cover crops, and maintaining permanent grasslands.

On what types of fields are AEP implemented?

Using spatially-explicit information from the Integrated Administration and Control System (IACS) 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 (Alarcón-Segura et al., 2023, 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).

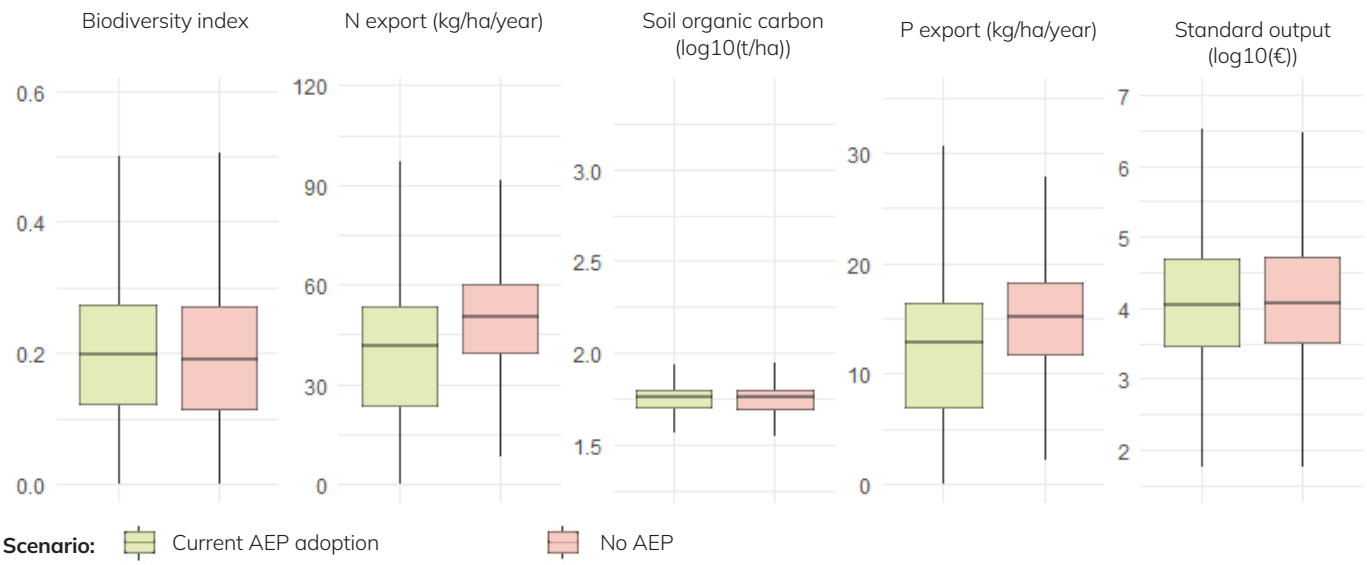

Figure 2: Comparison of farm-level values in ecosystem services' provision and biodiversity in the Mulde river basin for the current AEP adoption scenario (green), and an imaginary scenario without AEP (red). N = nitrogen, P = phosphorus. For more details, see Václavík et al. (2023).

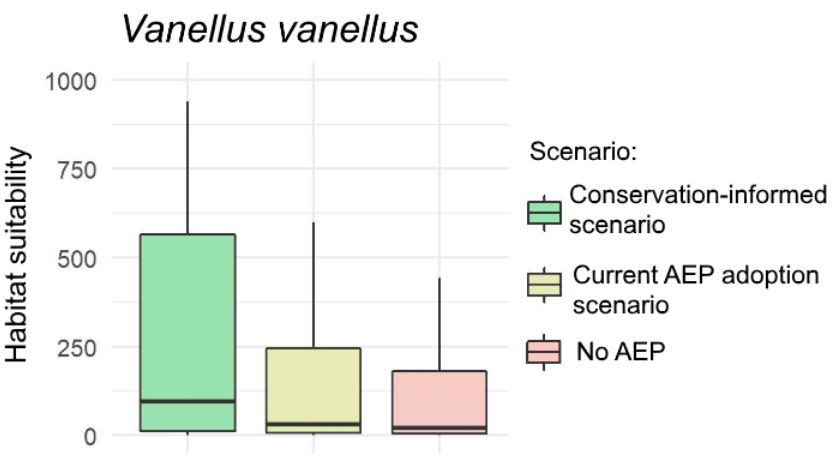

Figure 3: Habitat suitability for the lapwing (*V. vanellus*) under three different AEP adoption scenarios: a conservation-oriented scenario with increased AEP levels, the current adoption scenario, and a scenario with no AEP. For details, see Roilo et al., 2023.

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

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

- **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.

- **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:

- **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.

- **Implement more ecologically ambitious and effective AEP.** This should include non-productive measures on cropland, such as fallow land and buffer strips.

- **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.

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