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BIOGEA
Testing BIOdiversity Gain of European Agriculture with CAP greening

# Green and Blue Infrastructure, agricultural advice and knowledge exchange: Briefing from the BIOGEA Project

## Introduction

This briefing examines how farmers have received environmental advice on how to implement Common Agricultural Policy (CAP) Greening measures and the potential impacts on Green and Blue Infrastructure (GBI) in the agricultural landscape. Advisory services for farmers have been included as an essential part of CAP implementation since 2007. Despite this, few farmers access specialised advice. This is also the case in the BIOGEA case studies where if farmers receive advice, this tends to come from the state local agricultural offices and to be focused on administrative aspects of implementing the payment schemes rather than on their environmental objectives.

The importance of advice for transferring science to practice and implementing the environmental measures most important for biodiversity has long been acknowledged. Over time, the ideas on how to give advice have developed, thanks largely to social-science research demonstrating that top-down transfer from science to policy to farmers is unlikely to work. Instead, under Agricultural Knowledge and Information Systems (AKIS), a more integrative system, acknowledging different types of knowledge is proposed.

**Key findings:**

Some findings from the BIOGEA case studies show that advice provision already has the potential to benefit GBI:

- ✓ The requirement for advice to be available to support the implementation of cross compliance and greening measures has meant that farmers are not completely without support
- ✓ Farmers already have an understanding of the types of GBI features which are important for biodiversity and believe that it is worthwhile putting them in place
- ✓ A greater focus on integrating a range of different knowledge and understanding through the AKIS concept may lead to positive developments

Other aspects have worked less well, including:

- Strong reliance on the state agricultural local offices for advice has reinforced farmers' own priorities for putting in place EFA (Ecological Focus Areas) measures which fit best with farming practice and have the lowest risk of sanctions but which generally provide little in the way of biodiversity benefits
- While tools to support farmer decision making are available in Germany and Spain, there are few that focus specifically on landscape features
- Farmers in Bulgaria have poor access to decision-support tools focusing on environmental aims.

Overall, there is a need for access to a wider range of advice services and decision-making tools for farmers focusing more specifically on GBI. Additionally, increased efforts to demonstrate the reason for implementing particular measures, as well as their outcomes are needed if farmers are to be convinced about their usefulness.

**Why is the Common Agricultural Policy (CAP) important for Green and Blue Infrastructure (GBI)?**

The term Green Infrastructure (GI) or, where aquatic ecosystems are included, Green and Blue Infrastructures (GBI) can be used to describe a range of physical features (habitats) which can be linked to provide environmental benefits. In agricultural landscapes it includes connectivity features such as hedgerows, field margins, buffer strips, ditches and stone walls as well as landscape elements such trees and ponds. Likewise, features with clear agricultural purpose can also be part of GBI, if they deliver a wider range of ecosystem services (ES).

**In the European Commission's GI Strategy, it is defined as follows:**
"*a strategically planned* ***network of natural and semi-natural areas*** *with other environmental features designed and managed to deliver a wide range of ES. It incorporates green spaces (or blue if aquatic ecosystems are concerned) and other physical features in terrestrial (including coastal) and marine areas. On land, GI is present in rural and urban settings*."
(European Commission 2013)

Intensification of agricultural practice has led over time to a loss of green infrastructure. This occurred both on the field, farm and on the landscape level (Gámez-Virués et al. 2015). There is significant research to show, however, that maintaining landscape complexity is the key to retaining farmland biodiversity (Benton et al. 2003). The BIOGEA project results have confirmed that a certain amount of GBI, or non-farmed habitat, is needed in agricultural landscapes to meet biodiversity requirements (Concepción et al. in review). However, the need for additional GBI features depends on the existing landscape structures (Concepción et al. 2012).

Policy measures exist to maintain existing GBI across the farmed landscape (e.g. cross compliance measures which aim to prevent the destruction of landscape features) or increase GBI in specific areas (e.g. agri-environment measures for introducing flowering strips) (see figures 1 and 2 for examples). Greening, being put in place across the farmed landscape, was supposed to provide an additional mechanism to maintain GBI where it already exists and encourage its creation where there is little diversity on a broader scale than agri-environment currently does.

**Greening requirements**
All non-organic farmers with more than 15 hectares of arable land, applying for CAP Pillar 1 support must put in place ecological focus areas (EFAs) i.e. 5% of their arable land must be managed to enhance biodiversity and support eco-system services. The elements that can be counted towards the 5% EFA target include non-productive features such as buffer strips, field margins, trees (isolated, groups, rows), hedgerows, stone walls, fallow land as well as ponds and ditches, but also productive features such as catch crops and nitrogen fixing crops. Farmers who already have GBI features in place would not have to change practice, while those with little GBI should increase the amount of environmentally beneficial features.
See Marsden et al. (2017a) for more information on the relationship between GBI and the CAP measures



**Figure 1:**
Structurally rich agricultural landscape from the BIOGEA case study area XY in Bulgaria



**Figure 2:**
Flowering strips in the Tauberbischopshof case study in Germany.

**Why did greening fail for GBI?**

In order for greening to meet the above objectives, farmers would have to carefully select their EFA options to fit with the existing landscape features and GBI structures as well as other measures such as cross compliance and agri-environment schemes. If the aim is to build up a genuine "infrastructure" i.e. natural and semi-natural areas which are linked with one another, farmers must not only consider this on their own land but must also work together with neighbours to carry out joint actions. It is unlikely that many farmers have the time, information or knowledge to do this alone. The lack of specific advice linked to putting in place selected EFA measures has therefore been one of the main failings of greening (EIP-AGRI 2016), and BIOGEA case studies below).

The BIOGEA case study results support the findings of other researchers to show that without targeted advice, and despite incentives through the "weighting" of options (see (Marsden et al. 2017)), choices on greening have been largely motivated by how close measures are to existing farming practice (Ecorys et al. 2016; Alliance Environnement and the Thünen Institute 2017) and how high the risk of sanctions attached to a specific measure are (Joorman and Schmidt 2017). The measures connected with agricultural production (nitrogen-fixing crops, catch crops and fallow areas) are significantly more popular but the first two in particular rarely benefit species and habitats (Underwood, Tucker 2016; European Commission 2016, Pe'er et al. 2016). This has had the end effect that EFAs have provided financial support for existing landscape features, though even where these exist, they are not always declared under the greening area for fear of sanctions, but they have not had the effect of incentivising additional creation of GBI apart from the productive measures mentioned above (Zinngrebe et al. 2017). Additionally, although it was possible for member states to implement a "collaborative" greening measure, this was only implemented in the Netherlands and Poland (Pe'er et al. 2017) meaning that even if farmers have the best intentions, the measures they put in place, may not fit well with those of their neighbours and therefore in an overall landscape context.

**Findings from the BIOGEA case studies: access to advice**

In order to understand the current situation regarding advice provision, structured interviews were carried out with farmers, advisors, farming representatives and NGOs in the case study areas[1].

In all of the case study areas, the main advice providers were the state agricultural offices. Since the advice provided from this source covers all aspects of the CAP and is generally not specialised on environmental measures, a common weakness was that advice provision focused on compliance with the regulations, meeting deadlines and generally the administrative side of applying greening. Advisors also tended to have more of a "conventional" farming focus. Farmers had little specialist access to environmental advice. In terms of preferred means of accessing information, farmers all liked personal contact and on-site or business-specific consultation as well as the possibilities for exchange with their peers.

In all areas, farmers were not particularly familiar with the term GBI. However, they recognised individual GBI features. The extent to which they recognised features that were commonly present in the area varied and there was a higher recognition of those features which were relevant for agricultural payments in the specific country. In all areas, the environmental (and in some cases agronomic) benefits of GBI elements, when considered individually, are understood and appreciated. In many cases, these benefits are also perceived as being worth the costs of putting the measures in place. Farmers' main concerns, however, when choosing measures was integration into their existing farming practice. Meeting administrative requirements was also important to them, though interestingly not as much of a major concern as stakeholders and advisors thought (perhaps because they tended to see most of the farmers most worried about these aspects).

In all areas, farmers felt that they were poorly involved in the consultation process around policy adoption and implementation and that neither they nor their representatives on the regional level could influence the measures included in policy. They felt that they lacked feedback on why measures were important and what the impacts were of putting them in place.

[1] For more information on the precise areas studied, see: https://www.biogea-project.eu/case-studies

**How can advise provision address the gaps for GBI?**

Much research has been carried out on what motivates farmers to choose environmental measures. Willingness to carry out environmental work depends on core values but also on access to information and understanding and trust for those who are providing them with information (described as motivation, ability and engagement by (Mills et al. 2016). While core values may be difficult to change, farmers understanding and motivation are influenced by their interactions with those advising them, NGOs and their peers. This explains the essential role of interacting on a human level with a range of environmental actors. Participatory processes where farmers are involved in selecting, testing and feeding back on measures may have particular potential for this reason (Beckmann et al. 2009). Additionally, feedback loops, where farmers learn more about the environmental effects of the measures they use are important for them to believe that they are having an impact and increase their trust in the selected measures (Stupak et al. 2019).

**What tools are available?**

The importance of advice has long been acknowledged by agronomists and environmentalists alike. The improved understanding of farmers motivations afforded by social science has led to more recent developments in the approaches to knowledge exchange, learning and advice. Instead of a linear knowledge transfer where knowledge is created by research and then passed to farmers through advisory services, the value of different types of knowledge is acknowledged. A term that is increasingly applied to the bringing together of these different types of research and understanding between a range of actors is Agricultural Knowledge and Information (or Innovation) Systems (AKIS). This acknowledges the importance of using a range of tools and methods to bring scientists, NGOs and farmers together to test solutions (Knierim 2015). It should integrate AKIS actors such as farmers, farm workers, agricultural educators, researchers, non-academic experts, advisors and supply chain actors to combine their various knowledge and understanding. The approach acknowledges the importance of different types of learning such as peer-to-peer exchange, increasingly encouraged through a range of projects (e.g. the H2020 projects Agridemo and plaid).

The AKIS approach also places a focus on understanding how to target advice provision tools and on increasing the range of tools available to farmers, especially in an era when more and more are well connected through the internet and with social media. Advisors need to have a good understanding of the tools at their and the farmers' disposal for implementing environmental actions. Decision support tools are regarded as bespoke or generic software, email / text alerts, online calculators or guidance, phone apps, paper-based guidance (Rose et al. 2016). In the BIOGEA project, tools aimed at advisors and the advisors support of farmers were also included in this list. Rose et al (2016) identified core factors for uptake of tools. These were: performance; ease of use; peer recommendation; trust; cost; habit; relevance to user and farmer-adviser compatibility.

**Findings from the BIOGEA case studies: existing tools in Bulgaria, Germany and Spain**

The BIOGEA project examined the range of existing instruments and tools that are already used at national level in the three case study countries.

Farmers and consultants in Spain and Germany have access to a fairly wide range of tools to enhance biodiversity and implement greening measures. In Germany, however, the range of formats is more diverse than in Spain. For example, webinars or print templates are already available as aids in Germany, while only digital guides are available in Spain. The range of services specifically related to landscape elements is low in both countries.

In contrast to Spain and Germany, the number of tools available to farmers and advisors in Bulgaria is significantly lower and these focus almost exclusively on the financial aspects for the greening measures.

Overall, most tools are offered in the form of guides. These might be revised to better and more clearly address the farmers' persisting concerns on the bureaucratic procedure and requirements for specific measures. Given the farmers' preference for personal exchange and habit of searching information online, however, this is unlikely to suffice. Other formats could include podcasts, explanatory videos, website entries, lectures and discussion rounds at events or newsletters.

The findings of this review were used to inform the production of specific tools through the project.

**How is this taken into account in the CAP?**

The importance of advice has been recognised by policy makers and integrated into policy since the 2007-14 CAP. The requirement to establish a Farm Advisory System (FAS) was put in place following the "CAP Health Check": regulation 1783/2003, required member states to put a FAS in place by the start of 2007. The FAS should provide a Farm Advisory Service in each member state on a voluntary basis for farmers with a priority for those who receive more than 15,000€ per year in direct payments, which should cover at least the cross compliance requirements. There was no requirement for the service to be free of charge but at the same time, two measures were inserted in the rural development regulation to allow member states to support individual farmers seeking advice with up to 80% of the costs and for services training advisors. An assessment of the FAS after the first period of its implementation showed that most member states had succeeded in putting it in place, albeit a bit later than planned. Access to advice was however limited, with roughly 5% of farmers receiving advice through the FAS. Advice tended also to be focused on larger farmers (European Commission 2009).

In the 2014-20 CAP, the FAS was continued with a broader range of requirements for the FAS to also cover greening and RD measures for modernisation, competitiveness, innovation and entrepreneurship, requirements related to the Water Framework Directive and to pesticide use. Additionally, the European Innovation Partnership for Agricultural productivity and Sustainability (EIP-AGRI) was launched in 2012 with the idea of bringing advice provision and science closer together. Operational Groups, thematic networks and multi-actor projects are supported under this framework in order to bring farmers directly into research. This framework is built upon in the CAP after 2020 proposals adopting the AKIS terminology (see above) to bring the existing groupings together for a stronger focus on agricultural advice. The up to 23% cuts to Pillar 2 (see (Marsden and Jay 2018)), however mean that the support to member states to support advisor training and farmers to access the services is unlikely to increase.

**How will this change under the new CAP**

The integration of "AKIS 2.0" into the new CAP is viewed as an important part of the cross-cutting CAP objective on 'modernisation of the sector by fostering knowledge, innovation and digitalisation of agriculture and rural areas' (Art. 5 of the CAP Strategic Plan regulation) (European Commission 2019). Under the future CAP, the farm advisory services (article 13), the CAP Networks (art. 113) and the EIP-AGRI (art.114) should contribute to this objective. There is also a requirement to include national AKIS strategies in the CAP Strategic Plans (Article 102). This comes however in the face of significant challenges. The increasing privatization of knowledge and the ever stronger dependency of farmers on commercial solutions is seen to be a significant problem for accessing advice (Standing Committee on Agricultural Research 2017). Involving farmers in research projects, as the BIOGEA project has done, is one way of strengthening links between policy and practice. Additionally producing outputs specifically aimed at farmers from research can help reduce the length of time between research coming out and new practices being adopted.

**Next steps for the BIOGEA project**

BIOGEA's analysis has focused on the implementation of "greening" and its impact on GBI. As part of this, the advice attached to greening and the tools available to farmers to help them implement greening have been researched. The BIOGEA project is already implementing the AKIS concept by involving farmers directly in research. The outcomes of the project must also be targeted directly at farmers. In order to address these issues further, BIOGEA will:

- Target specifically the gaps in advice provision in the three case study countries by producing adapted tools depending on needs (in Germany and Spain support for setting up workshops, in Bulgaria, advisory manuals and videos).
- In the policy recommendations, examine ways to encourage collaborative approaches to encourage sufficient GBI on the landscape scale.
- Target recommendations specifically at advisors in the context of the next CAP to show the need for GBI across the farmed landscape.

**Further reading**


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**BIOGEA Project**

This briefing is a product of the project Testing BIOdiversity Gain of European Agriculture with CAP greening (BIOGEA) which is supported by the BiodivERsA funding programme. It researches the impact of land use change on Green and Blue Infrastructure (GBI) in the agricultural landscape. The impacts of policy on GBI and GBI on biodiversity and ES are examined through policy analysis on the EU and national level and biological monitoring and modelling in six case study areas in 3 Member States (Germany, Spain and Bulgaria) chosen to represent intensive and extensive landscapes in different biogeographic regions. Project outputs will include advisory tools and policy recommendations for the CAP reform.

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