Policy Brief

BIOGEA

A Green Architecture for Green Infrastructure

How the future CAP could support Green and Blue Infrastructures

Cover photo: Dry croplands, Spain © Dr. Mario Diaz

Main findings

Green and Blue Infrastructures (GBI), such as hedgerows, trees, grass-strips, water courses and ditches, land lying fallow or extensive arable land and extensive grassland, support biodiversity in farmland. The biodiversity benefits are however context and management specific.

In all agricultural land, a minimum amount of GBI is needed for biodiversity. Additional GBI produces the greatest benefits in landscapes of intermediate farming intensity. Maintaining existing GBI is the best policy for the most extensive systems. In intensive systems, more targeted efforts to reintroduce and restore GBI are needed to obtain significant biodiversity benefits.

Farmers, when making choices on environmental measures, choose the measures closest to their existing farming practice. Current advice provision is not encouraging uptake of the most environmentally beneficial options.

Recommendations

At least 10% of farmland on the farm level should be ecologically highly effective GBI. This mean semi-natural and connectivity features but not productive measures.

Regionally targeted environmental objectives should be implemented at the **landscape scale.** This might include encouraging, through the eco-schemes, more extensive farmland management to improve habitat connectivity. A target of minimum 10-20% extensive farmland management on a regional level should be introduced.

Member states should demonstrate that **sufficient monitoring** for GBI, and their environmental effectiveness, is in place for their strategic plans to be accepted.

Advice to farmers has to be farm specific and should also **explain the biodiversity benefits** of certain measures. State agriculture officers and advisors need to understand the environmental reasoning of the proposed measures in order to promote them well.

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Background

Biodiversity is declining globally. During the past decades, agriculture has been a key driver of the loss of biodiversity with biodiversity in agricultural landscapes declining even faster than in other landscape types [1]. For instance, farmland birds have declined by 57% between 1980 und 2016 [2].
The BIOGEA project looked at the relationship between the different aspects of landscape complexity (see box on page 3) provided by GBI and their biodiversity benefits. Most GBI elements showed potential to support biodiversity. However, their effectiveness vary significantly among study sites and farming systems. Nonetheless, some general conclusions on their impacts can be drawn.

The same needs for humans and nature

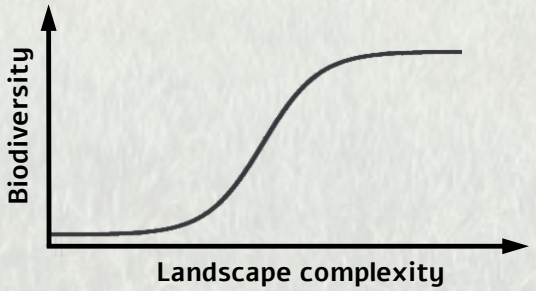
People are also leaving rural areas. The intensification of agricultural systems led to a reduction of the farming workforce needed. Rural depopulation has been reinforced by a subsequent loss of infrastructure and services (schools, doctors and shopping facilities).
Like humans, farmland plant and animal species depend on different infrastructures and services to fulfill their various needs. Habitats, such as feeding grounds and hiding places, are located in different places. Therefore, safe corridors connecting these features are essential. The term 'Green and Blue Infrastructure' (GBI) describes the parts of our landscape that species depend on as habitat and corridors for safe movement. It is therefore crucial for biodiversity, but also for the provision of other ecosystem services [3]. In agricultural landscapes, GBI consist of linear features such as streams, ditches, hedgerows, buffer strips as well as areal measures such as fallow land, extensively managed arable land and extensive pasture.

Types of GBI

The project found, natural or semi-natural small-landscape elements and connectivity features were important for overall biodiversity. In-field habitats, especially grassland and fallow land, were relevant for more specialist farmland species. Small field size (preventing field size enlargement) benefitted both, overall and farmland-specialist diversity. However, permanent and cover crops, agroforestry and crop diversification showed fewer benefits. Introducing small amounts of additional GBI showed the greatest net benefits in landscapes farmed at intermediate levels, supporting theoretical expectations [4]. Significantly larger amounts of GBI are needed to make a difference in the most intensively farmed landscapes due to limited wildlife dispersal. In the most extensive systems, enough GBI already exists, so the emphasis should be put on maintenance / ecological improvements of current farming practices and management measures [5].

Amounts of GBI

The relationship between biodiversity and GBI is not linear. Only after a minimum threshold of GBI is reached, significant benefits for biodiversity will be seen [6].



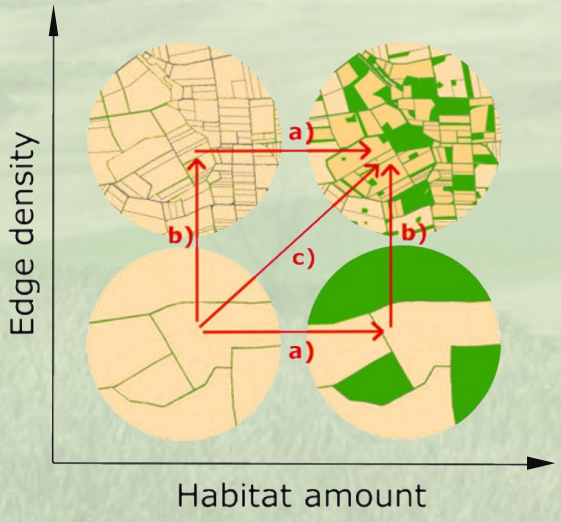
and results

GBI and the CAP

GBI has decreased with agricultural intensification over the last seventy years.
The CAP aims to support GBI by protecting landscape elements via cross-compliance as well as encouraging the maintenance and creation of GBI though agri-environment schemes. In the 2014 reform, CAP Greening introduced the obligation to manage at least 5% of arable land as “Ecological Focus Area” (EFA). This obligation could be met with landscape elements, non-productive features such as fallow land or field margins as well as with productive elements such as catch crops.

Landscape complexity through GBI

The different GBI elements such as patches of fallow land, hedgerows or small streams and their buffer strips all increase landscape complexity (c), which in turn benefits biodiversity. The underlying variables behind that term are the amount (a) and diversity of habitats created, as well the amount of connectivity (b). [7]



Graph from:
Martin et al. (2019)

Impact of the CAP on GBI

Over the last 6-8 years, there appears to have been little positive development of GBI features in the case study areas. Object-based image analysis (OBIA) of temporal series of orthophotos suggests that the greatest changes are seen in in-field elements. The CAP appears not to have been a driver for increasing habitat availability in the farmed landscape.

Farmers perceptions and choices

While the term GBI is not widely used in communication with farmers and is not well known, farmers recognised GBI features on their farms. Comparing the features recognised with those mapped through fieldwork showed that farmers perception of the features present was strongly influenced by needs to manage particular elements for agronomic or policy reasons. Farmers’ main motivation for choosing particular EFA options was the compatibility to their existing farming practice and also management requirements they could easily understand. When asked to rank a range of different reasons for choosing EFA options, farmers ranked environmental concerns last.

Advice on management options

Farmers had varying access to information materials and advice in the different case study areas. A similarity between all areas was that farmers were mainly informed about schemes by state agricultural offices. The focus on advice was placed on meeting the administrative and technical requirements of support schemes (e.g. avoiding the delineation of small landscape features in the land parcel identification system (LPIS). There was little or no advice on the promotion of GBI.

Background photo: Mixed croplands, Bulgaria © Dr. Simeon Lukanov

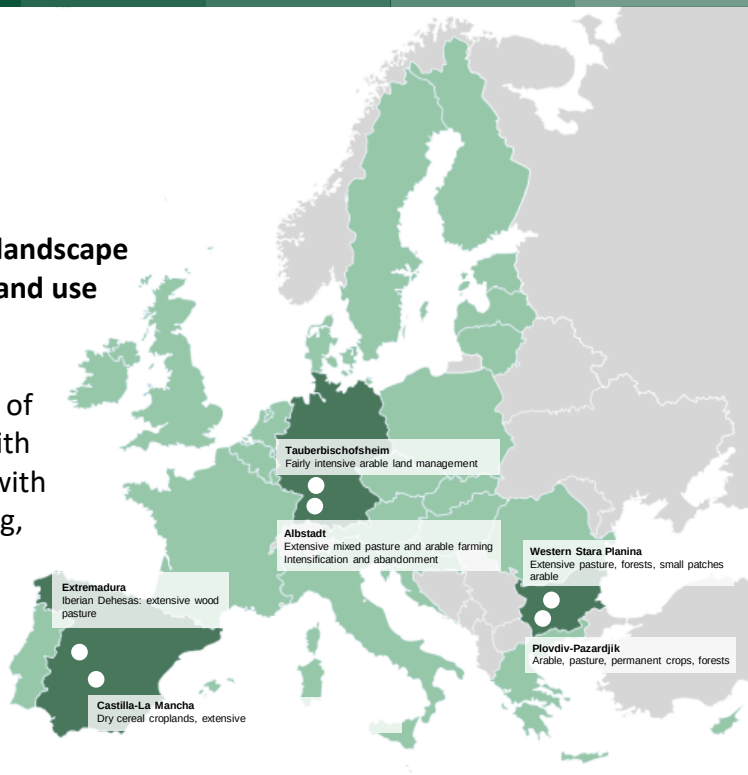
Testing BIOdiversity Gain of European Agriculture with CAP greening

The BIOGEA project

BIOGEA aimed to investigate the:

- **Impact of GBI on biodiversity**
- **Impact of land use change on GBI in the agricultural landscape**
- **Impact of the Common Agricultural Policy (CAP) on land use change**

A case study approach was used to combine the analysis of policy at the European Union (EU) and national levels, with the analysis of its local level implementation, as well as with in-field biodiversity and habitat monitoring and modelling, in six case study areas from South-western, Central and South-eastern Europe. In each country a more extensive and more intensive farming system was examined.



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Male Whinchat, Germany © Karin Jaehne - shutterstock.com

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