BIOGEA
Testing BIOdiversity Gain of European Agriculture with CAP greening

CAP Greening: Learning from the Local Level

Case study report:

Albstadt, Germany



2019

BIOGEA Project

BIOGEA aims to examine how the implementation of CAP greening measures introduced in the 2014-2020 period impact land use and in turn change Green and Blue Infrastructure (GBI) in the agricultural landscape. 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), the impacts of policy on GBI and GBI on biodiversity are examined.

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BIOGEA Case study report: Albstadt, Germany

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1. Introduction to BIOGEA project

The BIOGEA project investigates the impact of land use change on the Green and Blue Infrastructure (GBI) in the agricultural landscape. GBI includes landscape structures and habitats, essential for ensuring connectivity between habitats and allowing the movement of species, thus contributing to preserve biodiversity in agricultural landscapes. GBI also provides a range of ecosystem services, which are necessary for meeting environmental policy objectives. Hence, BIOGEA Biogea also aims at analysing how GBI relate to biodiversity and associated ecosystem services.

The research approach is a combination of policy analysis on the EU and national levels and local level implementation as well as biological monitoring and modelling in six case study areas in 3 three Member States (Germany, Spain and Bulgaria). Collaborative work with stakeholders (farmers, advisors, administrators, researchers, experts and NGOs) across scales (EU, national and local) ensured that different opinions and experiences were integrated throughout the project's implementation.

Policy analysis

The policy analysis was carried out both vertically and horizontally: a top-down analysis, from an EU-wide scale to a local scale examining the EU targets for GBI and CAP Greening and their translations into national law. The policy research was based on literature reviews and document analysis at the EU and national levels. Interviews and meetings with EU and national policy experts provided additional views on relevant CAP measures.

Case studies

Targeted case studies were done in six paired intensive/extensive sites in Bulgaria (Plovdiv-Pazardzhik region and Western Stara planina), Germany (Tauber and Albstadt) and Spain (dry cereals croplands in Castilla-La Mancha and dehesas in Extremadura).

Biodiversity and GBI monitoring and modelling in case study areas

Biodiversity and habitat (GBI) field surveys were carried out in each case study area in order to evaluate how the implementation of different CAP Greening schemes impact on biodiversity. An area survey approach was used to obtain information at landscape scale on GBI as well as on specific biodiversity parameters. In plots of 500 x 500 m landscape elements were mapped, Key plant species and species groups were recorded via transect walks in arable land and grassland at up to 4 different points. Bird species were recorded at up to 5 points with a point-count method. Generalized linear models (GLM) were used to analyze the relationships between biodiversity (i.e., plant and bird species richness and Shannon's diversity index of birds) and habitat metrics across plots within each study region. Additionally, we used historical imagery to map changes on GBI occurrence in LTS from 2012 to 2018.

Analysis of CAP Greening implementation in case study areas

The local level implementation of CAP Greening scheme was analysed in participatory manner by involving farmers and local experts, farm advisors, and decision makers. Two structured questionnaires (containing both open and closed questions) were developed for

farmers and local stakeholders in each case study area. The questionnaires had similar structure and content to allow comparison between farmers' and stakeholders' results. Their experiences and views on changes in local land use practices and impacts of the CAP on green and blue infrastructure are integrated throughout this case study report.

Albstadt is the extensive land use case study area in Germany under the the BIOGEA project. Case study agriculture and policy data for and from the region was collected in the period April – May 2018. Biodiversity data was collected in the period May 2017 and April to mid-June 2018.

Meetings and interviews with local farmers, administrators, advisers and NGOs' representatives in Albstadt were organised in the period 20 June – 30 August 2018. A stakeholders' round-table to discuss the preliminary findings of the two German case studies was organized in October 2018. The current report systemizes the findings and conclusions from these activities.

- **Interviewed stakeholders**

Ten interviews with local stakeholders were carried out in the period 20 June – 30 August 2018. The local stakeholders represented the diversity of local institutions and non-public organisations: local/regional agriculture authorities (n=2), local/regional environmental authorities (n=2), farm advisors (n=2), farmers' organisations (n=2), local environmental NGO (n=1) and local expert (n=1).

- **Interviewed farmers**

Ten farmers were interviewed in the period 21 June – 17 July 2018. Three interviewed farmers had farms of size between 30 ha and 100 ha; the other seven had larger farms of over 100 ha. Mixed farming and livestock farming systems were represented by four farms each. There was one farmer with purely arable farming system and one combining mixed farming system and biogas plant.

2. Albstadt case study area

The case study area is situated in the Swabian Alb, which is located in south-west Germany in the federal state of Baden-Wuerttemberg (NUTS 1 level). The case study area covers two districts (NUTS 3 level) - Zollernalbkreis and Tuttlingen (Figures 2 and 3) with a total area 1,652 km^2.

The altitude of the area ranges from 614 m to 966 m a.s.l... The climate is typically humid with more precipitation than evapotranspiration. The mean annual temperature is 7.2 °C and the annual rainfall amounts to around 1684 mm. The slope ranges from flat (< 3°) at the plateau of the Swabian Alb to up to steep slopes with more than 20° inclination.





Tuttlingen **Zollernalb-Kreis**

Figures 2 and 3. Location of the case study areas

Agricultural area, including natural grasslands, cover 43.9% of the land in the case study area (CORINE Land Cover 2012). Forests and scrubland have a larger share of 47.16%. Water bodies have negligible coverage (0.04%). Artificial areas cover as much as 8.9% of the case study area territory.

The case study area is a rural region with a few urban centers. There are six towns with a population above 10,000 inhabitants and three cities with a population above 30,000 inhabitants - Albstadt, Balingen and Tuttlingen. The overall population is 325,520 inhabitants (2016) with a population density of 197 people/km^2. The number of employees in the agricultural sector continuously decreases.

2.1. Agriculture land use

The utilised agricultural area (UAA) was 58,923 ha in 2016 (Table 1). Permanent pastures are the major agriculture land use (63.8%), followed by arable land (36.0%). Permanent crops have a minor share of 0.2%.

Table 1. Agriculture land use types in Albstadt case study area[1]

Land use types	2007		2016	
	UAA (ha)	Share in total UAA (%)	UAA (ha)	Share in total UAA (%)
Arable land	22,465	38.4	21,198	36.0
Permanent crops	194	0.4	121	0.2
Permanent pastures	35,775	61.2	37,598	63.8
Total	**58,434**	**100**	**58,923**	**100**

Source: Agriculure statistics

Traditionally, arable farming was the dominant land use until the XIXth century. It was practiced alongside migratory herding (mainly with sheep) on less productive sites. The growing imports of agricultural products led to an expansion of grasslands, which were used later mainly as pastures for sheep. The former pastures were abandoned or reforested in the course of the years. Today there is still a high coverage of grassland in a mix of intensive and extensive use. Fruit orchards can be found around settlements.

The trend of reducing arable land and orchards in favour of grasslands continues. Arable land has reduced by over 1,200 ha since 2007, while permanent pastures have increase by over 1,800 ha for the same period.

The CORINE Land Cover data for 2012 provides comparable distribution of the agriculture land in the case study area. Arable land covers 30.9%; pastures and natural grasslands cover 66.4% (Table 2, and Figure 4). Permanent crops cover 1.9%. The share of heterogenous agricultural area is very small (0.8%), formed by mosaic cultivation patterns and land principally occupied by agriculture.

Table 2. Agriculture land cover types in Albstadt case study area

Land use types	Share in all agriculture land (%)
Arable land	30.9
Permanent crops	1.9
Pastures	66.4
Heterogenous agriculture areas	0.8
Total	**100**

Source: CORINE Land Cover, 2012

[1] agricultural structure survey, agricultural census, main land use survey of the federal state Baden Württemberg
https://www.statistik-bw.de/Landwirtschaft/Bodennutzung/05025033.tab?R=KR417
https://www.statistik-bw.de/Landwirtschaft/Bodennutzung/05025033.tab?R=KR327

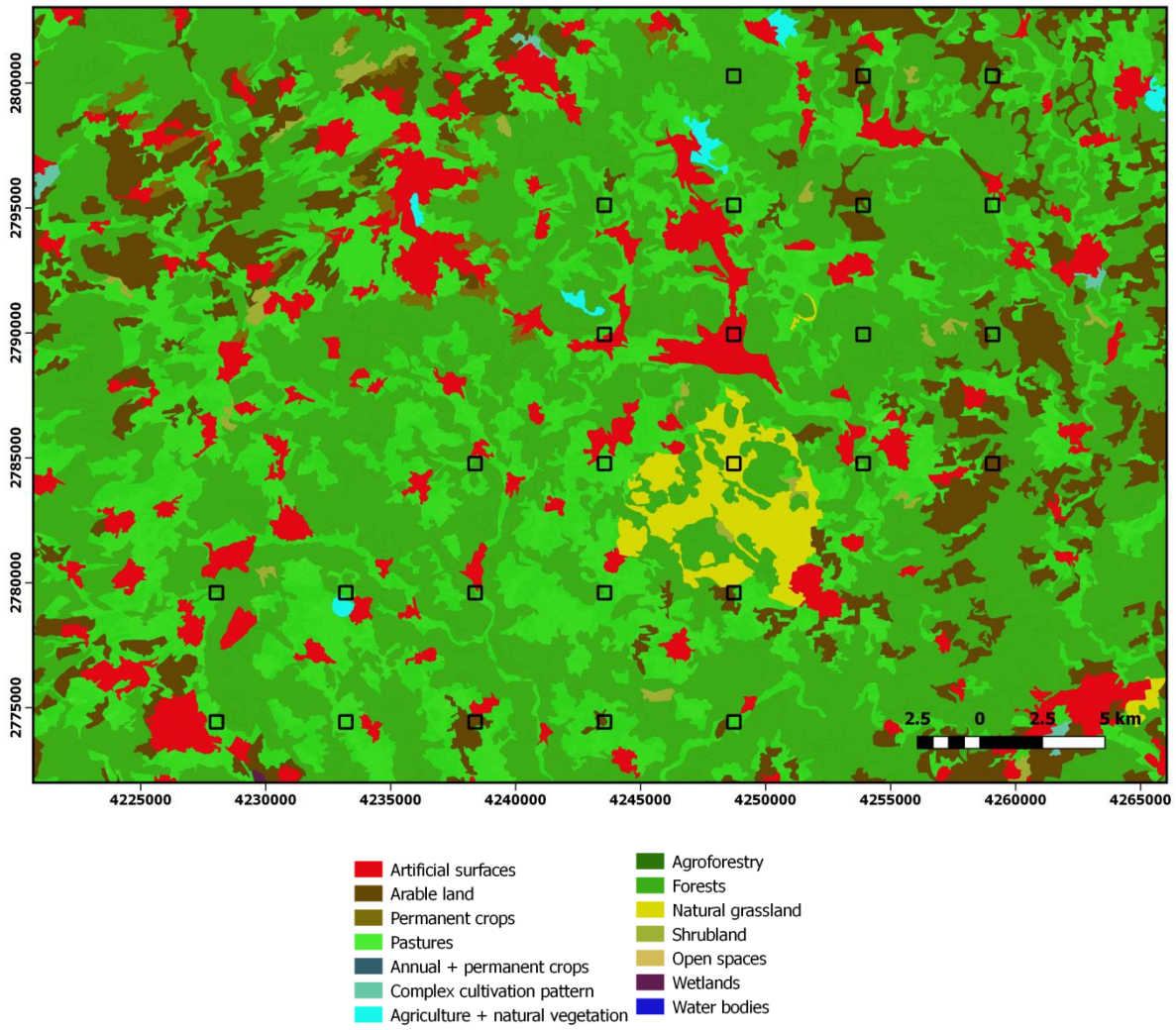


Figure 4. Corine Land cover in the case study area

2.2. Farms and farming systems

The total number of farms in Albstadt case study area was 1,125 in 2016 (Table 3). The number of farms in 2007 was 1,491, of which 860 had less than 20 ha. There is a decrease in the overall number of farms by 24.5% for the 2007-2016 period, mainly in the group of farms up to 20 ha. The farms of over 20 ha are 55.4% and manage 90.7% of the agriculture land in 2016.

Interpreting the data from a CAP Greening scheme perspective, 22.7% of the farms are considered green-by-definition due to their small size (up to 10 ha) irrespective of the farming system but manage only 3.0% of the agriculture land. Furthermore, their share in the total number of farms is continuously decreasing.

Table 3. Farms and agricultural land per farm size in the case study area[2]

Farm size	Number		Area (ha)	
	(no.)	(%)	(ha)	(%)
Up to 5 ha	24	2.1	1,765	3.0
5.1 - 10 ha	232	20.6		
10.1 - 20 ha	247	22.0	3,701	6.3
20.1 - 50 ha	253	22.5	8,269	14.0
50.1 - 100 ha	169	15.0	12,188	20.7
Over 100 ha	201	17.9	33,000	56.0
Total	**1,125**	**100.0**	**58,923**	**100.0**

Source: Agriculture statistics

Table 4. Farms per farming system in Albstadt case study area (number)

Farming systems	in Tuttlingen	in Zollernalbkreis	Total in CS area	
	(no.)	(no.)	(no.)	(%)
Arable farming[a]	169	314	483	42,9%
Horticulture[a]	4	11	15	1,3%
Perennial crops[a]	-	2	2	0,2%
Forage farms[a]	200	309	509	45,2%
Enrichment farming[a]	6	5	11	1,0%
Horticulture[b]	-	4	4	0,4%
Livestock farming[b]	13	9	22	2,0%
Mixed farming[b]	32	47	79	7,0%
Total	**424**	**701**	**1,512**	

[a] *Specialized farm: more than 2/3 of outputs are obtained through focusing on one output.*

[b] *'Verbundbetrieb': Main output of the production focus is less than 2/3 of the output, but more than 1/3.*

Source: Agriculture statistics[3]

2.3. Farming systems intensity

The information about the input and use of mineral fertilizers in the case study area shows that in Tuttlingen it is 79.9 kg/ha, and in Zollernalbkreis – 83.8 kg/ha (2008-2011)[4], compared to a national average of 93 kg/ha (2009-2010)[4].

[2] Tuttlingen: https://www.statistik-bw.de/Landwirtschaft/Agrarstruktur/05015023.tab?R=KR327

Zollernalbkreis: https://www.statistik-bw.de/Landwirtschaft/Agrarstruktur/05015023.tab?R=KR417

[3] https://www.statistik-bw.de/Service/Veroeff/Statistische_Berichte/346516001.pdf

[4] http://www.fachdokumente.lubw.baden-wuerttemberg.de/servlet/is/114102/U75-S7-N11.pdf?command=downloadContent&filename=U75-S7-N11.pdf

The grazing density is 0.19 LU/ha in Tuttlingen and 0.15 LU/ha in Zollernalbkreis in 2016[5], suggesting extensive grazing of pasture in the region.

3. Characteristics of the Green and Blue infrastructure in Albstadt

3.1. Green Infrastructure policy in Germany

Germany has a National concept for Green Infrastructure (Bundeskonzept Grüne Infrastruktur). Its aims at implementing the EU-concept for GI, substantiating the national strategy for biodiversity and at providing guidance for planners and other stakeholders. It does not contain any specific actions related to farmland. Instead, it focuses on existing protected areas, flood plains landscapes, and peatland soils. Therefore, agriculture is only indirectly affected by this concept.

3.2. Biodiversity designations and management requirements in Albstadt

Albstadt and its surroundings include a number of areas of the Natura 2000 network as well as nature reserves and nature parks. The dry grasslands on limestone, characterized through many characteristic species, are actively protected through conservation pasturing that prevents succession. Many species are part of natural habitats of high conservation value.

The number and territorial coverage of the protected areas (Table 5) represent the biodiversity values of the case study area.

Table 5. Protected areas in Albstadt[6]

Protected areas	Unit	Zollernalb	Tuttlingen	Total in CS area	% of CS area
Nature protection areas	Nr	53	25	78	
	Area (ha)	1,561.57 (1.7%)	2,443.51 (3,33%)	4,005.08	2.4 %
SCA/ SPA areas	Nr	17 / 3	8/3	25	
	Area (ha)	12,361.67 / 20,299.06 (13.47% / 22.12%)	12,428.11 / 21,433.6 (16.87% / 29.19%)	66,522.44	15 %
Nature parks	Nr	2	2	2	
	Area (ha)	17,897.96 (19.5%)	56,676.87 (77.18%)	74,574.83	37.5 %

* FFH areas represent the Special Conservation Areas under the EU Habitats directive.

[5] Regionaldatenbank Deutschland, Landwirtschaftliche Betriebe mit Viehhaltung und Zahl der Tiere - Stichtag - regionale Tiefe: Kreise und krfr. Städtem https://www.regionalstatistik.de/genesis/online;jsessionid=5A17998823786AF7EB63761F7F597C04.reg2?Menu=Willkommen

[6] https://udo.lubw.baden-wuerttemberg.de/public/pages/download/index.xhtml?file=rep7171967918028055873.pdf&mimetype=application%2Fpdf&printname=Schutzgebietsstatistik%20Kreise

Natura 2000 network

There are 25 Natura 2000 sites in the region, and almost all of them have management plans.

Farming related requirements in the Natura 2000 management plans

The Natura 2000 areas cover agriculture land comprised of grasslands and orchards as well as arable land. The management requirements related to agriculture land are multiple depending on the habitat and the protected site. Examples of management requirements are the number and timing of mowing activities, grazing activities, grazing with different species, management of trees in line, etc. They underline the need either not to intensify grazing or in some cases to re-introduce grazing after preparation of the area (e.g. cutting of trees if a meadow is to be rehabilitated).

The permanent grasslands in Natura 2000 Special Conservation Areas are defined as environmentally sensitive grasslands.

Moreover, Baden-Württemberg supports specific habitats, e.g. juniper heaths and mountain hay meadows, through their support programme 'Landschaftspflegerichtlinie (LPR)' (Directive on countryside conservation) financed from EU, national and regional funds. Voluntary contracts with farmers are a common measure to protect sensitive habitats in the agricultural landscape ("Vertragsnaturschutz").

3.3. Water designations and management requirements

- **River-basin management plans**

The case study area falls within the Danube riverbasin in Germany. The Danube riverbasin management plan identifies agriculture as one of the biggest sources of nitrate and phosphorous emmissions and stresses the need for counter-acting measures[7].

- **Flood-risk maps**

The Flood Risk Management Plan (*Hochwasserrisikomanagementplan*) contains maps and specific objectives for the Danube area located in Baden-Württemberg[8]. Flood risks maps and risk assessments are available for the region. Several flood risk areas are identified: around the city of Tuttlingen on the Danube river; and smaller ones around the city of Balingen on Eyach river and municipality of Straßberg on Schmiecha river.

Retention areas are foreseen and included in several measures. The agriculture sector is mentioned in the flood risk management plan essentially as a target of information in order to adapt agricultural practices in flood risk areas to be able to limit the damages in case of flood events.

[7] http://www.icpdr.org/flowpaper/viewer/default/files/nodes/documents/drbmp-update2015.pdf
[8] https://www.hochwasser.baden-wuerttemberg.de/documents/43970/44031/HWRMP_Donau_24112015.pdf/0b86c422-1303-47b0-aac4-8bcfc8b0e093

Guidance and trainings for adapting the agricultural activities in flood risk areas is developed at Baden-Württemberg level. The information is disseminated at regional and local level. For example, soils with specific erosion potential need to comply with good practice standards, which are controlled within the framework of cross-compliance via local agricultural authorities. The soil erosion risk is based on existing soil maps with various erosion-potential-status.

- **Nitrate vulnerable zones**

The nitrate loads of around 100 kg/ha/year in the region of Baden-Württemberg exceed the threshold level (50 kg/ha/year). The alarming situation concerning nitrate pollution in Baden-Württemnberg, motivates the state of Baden-Württemberg to start a "nitrate and ecological transformation"[9] initiative. It decides to develop a regional nitrate strategy at the end of 2017. The strategy aims at using fewer fertilizers, higher nitrate efficiency, less phosphates and less pesticide.

The case study area Albstadt has one problematic area regarding nitrates – the municipality Dürbheim in Tuttlingen district.

- **Water protection areas**

The state of Baden-Württemberg has 2300 water protection areas covering 950.000 ha. The protection is under the water regulation "protection and compensation directive" (in German "Schutzgebiets- und Ausgleichsverordnung", SchALVO[10]).

The management requirements for the agricultural sector depend on the protection status of each area. Farmers can get financial compensation where their agricultural activities are impacted beyond the "normal" level of a sustainable/good practice agriculture ("ordnungsgemäße Landwirtschaft").

The protection status is zoned in the following way:

- Zone I: mown grassland. Mown grass should be transported away, no pesticides, no fertilizers (mineral fertilizer only in some cases).
- Zone II: no animal fertilizers, no manure, grazing should be only allowed where the cattle number and grazing duration are adapted to the fodder capacities of the area and the cattle drinking points are regularly moved from one place to another.
- Zone I and II: no changes of land use (apart from plantation of orchards if adapted to the territory and not substantial area), no pesticides containing Terbuthylazin or Tolylfluanid, obligation to adapt any agricultural activity in order to reduce nitrate leaching/washing.
- Problematic areas for nitrates: additionally, all year round grass cover is mandatory, any activities impacting soil and ground water percolation (such as tillage, irrigiation) have to be adapted to avoid nitrate leaching, adapt the crop diversification to avoid

[9] http://www.fachdokumente.lubw.baden-wuerttemberg.de/servlet/is/124541/?COMMAND=DisplayBericht&FIS=91063&OBJECT=124541&MODE=METADATA

[10] http://www.landesrecht-bw.de/jportal/?quelle=jlink&query=WasSchAusglV+BW&psml=bsbawueprod.psml&max=true&aiz=true

nitrate leaching especially in autumn. Precise guidelines are elaborated on various aspects for different types of crops and season in an annex of the regulation.

3.4. Climate mitigation and/or adaptation measures

There is a regional adaptation strategy at the regional level of Baden-Württemberg. It can fund various measures[11] to support e.g. cities but also business, including training and information, studies of vulnerability and concrete mitigation measures.

In the case study area, the energy and climate policy focuses on energy efficiency measures. Biogas as a renewable source of energy is mentioned in the working documents. It is noted that forage crops should not be used that deteriorate the situation of feed for livestock.

[11] At regional level https://um.baden-wuerttemberg.de/index.php?id=14055

3.5. Green and Blue Infrastructure assessment in BIOGEA project

The Albstadt case study area in Germany has a medium to high presence of Green and Blue Infrastructure (GBI) elements and features[12]. The main connectivity GBI elements comprise grassy and, especially, woody strips (hedges), and streams and ditches were also present. Main in-field elements were N-fixing crops followed by perennial crops. Solitary trees and groups of trees are abundant. Most land is forested or grassland.

3.5.1. Biodiversity assessment

The preliminary results of the modelling[13] of GBI-biodiversity relationships in the case study area provide the following highlights:

- The number of isolated trees was positively correlated to overall bird, and overall and main plant species richness, but negatively to threatened, farmland and threatened farmland birds.
- Tree groups affected negatively steppe, farmland, threatened, and threatened farmland birds.
- Agroforestry was positively related to overall bird diversity but affected negatively steppe, farmland, threatened and threatened farmland bird species.
- Grassland benefitted overall and main plant species richness and, marginally, steppe bird species.
- Cereal crops were detrimental for overall bird diversity, and marginally for farmland and threatened species.
- N-fixing crops marginally benefitted overall plant richness but affected negatively overall and threatened bird species.
- Mean size of herbaceous crops marginally benefitted steppe bird species, but affected negatively farmland bird diversity and main plant species richness.
- Richness of herbaceous crops also benefitted steppe bird species, but affected negatively overall plant richness and, marginally, overall bird diversity.

[12] Pardo, A.; Rolo, V.; Concepción, E.D.; Díaz, M.; Aneva, I.; Lukanov, S.; Oppermann, R.; Schraml, A.; Ullrich, B.; Moreno, G. 2019. Farmland biodiversity across diverse European agricultural systems: assessing the effect of Green and Blue Infrastructure. 1st Iberian Meeting on Agroecological Research, Évora, November 2018. https://www.biogea-project.eu/biogea-findings-presented-1st-iberian-meeting-agroecological-research-ibagreco

[13] Concepción, E.D.; Aneva, I.; Lukanov, S.; Moreno, G.; Oppermann, R.; Pardo, A.; Rolo, V.; Schraml, A.; Ullrich, B.; Díaz, M. 2019. Green and blue infrastructure and farmland biodiversity: Optimizing CAP greening as conservation tool. Oral presentation. 1st Meeting of the Iberian Ecological Society & XIV AEET Meeting. Ecology an integrative science in the Anthropocene. 4-7 February, Barcelona, Spain.https://www.biogea-project.eu/biogea-presentation-green-and-blue-infrastructure-and-farmland-biodiversity-optimizing-cap-greening

- Grassy strips affected negatively overall bird diversity and marginally steppe bird species.
- Woody strips (hedges), in contrast, benefitted farmland bird species.

The results of the biodiversity-GBI modeling relationships are somewhat coincident with studies carried out in central-European farmland: positive effects of woody traits (isolated trees, hedges, etc.) on overall diversity, which is dominated by forest or ecotonic species, and need for open low-intensity uses such as grassland and fallow for endangered farmland and threatened species. On these basis, the most recommend as potentially valuable "greening" options are: Promoting crop diversification to favour steppe birds, and promoting grassland, maintenance of isolated trees and agroforestry, and preventing field size enlargement to support plant richness, overall bird diversity and/or threatened (non-farmland) bird species[14].

[14] Concepción, E.D., Aneva, I., Jay, M., Lukanov, S., Marsden, K., Moreno, G., Oppermann, R., Pardo, A., Piskol, S., Rolo, V., Schraml, A. y Díaz, M. 2019. Optimizing biodiversity gain of European agriculture through regional targeting and adaptive management of conservation tools. Biological Conservation, submitted

3.5.2. Assessment of stakeholders and farmers' awareness on GBI

The BIOGEA project assesses stakeholders and farmers' awareness about the terminology "green and blue infrastructure". During the interviews, stakeholders and farmers were first asked about the term. When they stated their level of awareness, the definition was presented and examples were provided. After that they were asked about the recognition of the presence of GBI elements and features in the region (by stakeholders) or on farms (by farmers); as well as the knowledge about appropriate management practices for the GBI elements and features.

- **Awareness about the terminology "green and blue infrastructure"**

Overall, the awareness about the GBI terminology among the interviewed stakeholders (n=9) and farmers (N=10) was low (Figures 5 and 6).

Only one (environmental) stakeholder was certain about the GBI terminology. Two other were aware to some extent. The other six stakeholders (four agriculture and two environmental) were not aware about it.

Among the interviewed farmers, one was aware to some extent about GBI terminology. The other nine respondents were not aware about it

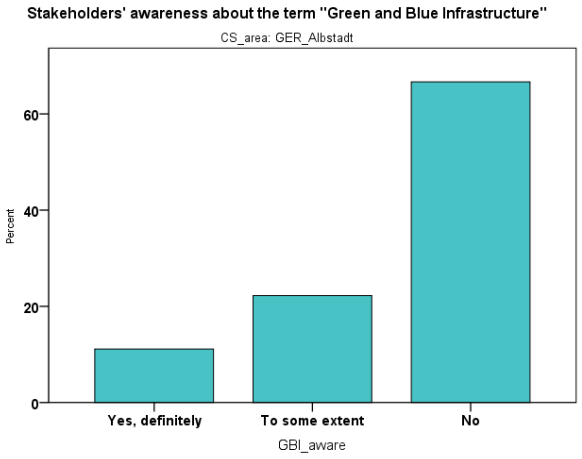


Figure 5. Stakeholders' awareness of GBI (n=9)

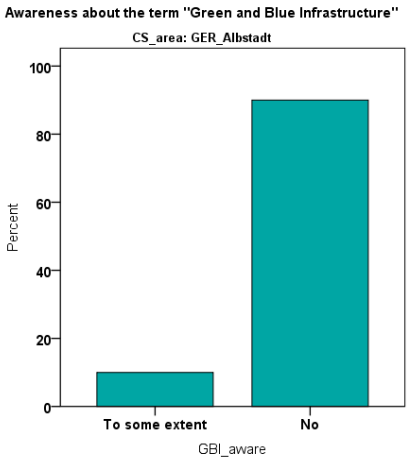


Figure 6. Farmers' awareness of GBI (N=10)

- **Recognition of the presence of GBI elements and features in the region**

Despite the low level of awareness about GBI terminology, when the specific elements and features were named, stakeholders recognised between 15 and 18 (mean value of 17) GBI in the case study area as a whole. Stakeholders indicated the presence of individual trees, trees in line, groups of trees, permanent grasslands and pastures, orchards, field margins, buffer strips, land laying fallow, hedges and wooded strips, wetland/bog, shrubland, ditches, areas with catch crops and green cover.

- **Recognition of the presence of GBI elements and features on farms**

The interviewed farmers (N=10) identified between 7 and 12 (mean value 9) GBI elements and features on their farms. All interviewed farmers (N=10) had permanent grasslands and pastures, trees in groups and field copses. Nine farmers had hedges and wooded strips, and isolated trees on their farms. Productive uses – areas with catch crops and green cover, and nitrogen fixing crops were present on eight and seven farms respectively.

- **Farmers' knowledge about appropriate management practices of GBI elements and features from environmental point of view.**

Eight of the interviewed farmers were definite that they were aware about the management of GBI elements and features from environmental perspective. One farmer responded he was aware to some extent and one stated that he was not aware. The examples provided referred to cutting of hedges to prevent them from growing on productive fields. One farmer explained that he did not cut the hedges too low based on information from the agriculture office. The other management practices mentioned were mowing and mulching, no use of fertilisers, and cutting back of rosehips.

In general, stakeholders' assessment of farmers' knowledge on GBI maintenance was positive – four said "definitely yes" and five "to some extent". One (agriculture) stakeholder stated that farmers lacked knowledge on GBI management from environmental perspective.

Eight stakeholders referred to the landscape maintenance contracts that some farmers had with the district administration. One stakeholder explained that "for some landscape elements the maintenance is done in accordance with the regional offices (municipalities), some are maintained through landscape maintenance contracts and the "Heckenkonzept" (hedgerow concept) for the district". Other stakeholders added that "some farmers are specialized in maintenance of landscape elements" but "maintenance from ecological point of view is more initiated from outside, not from the farmers". Another respondent described that "maintenance" of landscape elements/GBI means mostly cutting (of hedges) or mulching (of buffer strips) in the allowed time window. Not clear where to get information about how to maintain elements from an ecological point of view. There is no training in this context". However, three stakeholders referred to training provided by the district authorities about the maintenance of hedges, "but this works only for the farmers who are interested…". At the same time, one respondent added that "many of the ditches are not maintained in an ecological way. They are mulched/mown too often, and too intensively". Furthermore, one stakeholder explains that mapped landscape elements and features "are already included in the online tool for the joint application (FIONA). There are training courses on how to maintain the elements offered from the agricultural authorities, and explantations in the joint application forms."

4. Implementation of the CAP Greening scheme in Albstadt case study area

4.1. CAP Greening scheme in Germany

The CAP Greening scheme in the EU has three main elements and respective requirements – diversifying crops and ensuring ecologically focused areas on arable land above certain size as well as maintenance of permanent pastures. The specific requirements and the implementation choices in Germany are summarized below.

- **Crop diversification**

  Crop diversification requires farmers with arable land of over 10 ha to grow at least two crops for the areas up to 30 ha, and at least three crops for the areas over 30 ha.

The diversity of crops on arable land has to be present on farms in the period between 1 June and 1 July each year.

- **Ecological focus areas**

  Farmers with arable land over 15 ha must ensure that at least 5% of their land is in an ecological focus area (EFA) among which are ecologically beneficial productive land uses and landscape features. National governments define the list of EFA, from which farmers can choose what to implement on their farms.

Germany has one of the most extensive lists of EFA options in the EU, comprising land laying fallow,; nitrogen fixing crops,; catch crops,; buffer strips,; short rotation coppice,; agroforestry,; afforested areas,; strips along forests,; terraces and landscape features. The list of landscape features includes all features included in cross compliance such as field margins; hedges or wooded strips,; isolated trees, ; trees in line and trees in groups,; ponds,; ditches and traditional stonewalls.

- **Permanent pastures**

  There are two requirements for permanent pastures. The first one requires national or regional governments to maintain the ratio of permanent grasslands to the total agricultural area. The ratio may not be reduced by more than 5% compared to the reference year. The second one requires national governments to designate Environmentally Sensitive Grasslands in Natura 2000, in certain cases they may also be outside Natura 2000 areas. Environmentally sensitive grasslands cannot be ploughed or converted.

In Germany, farmers with permanent pastures that want to change their land use must request permission. The permission is not granted if there has been a loss of more than 5% of the permanent pastures compared to the status in 2005 at the federal level (Baden-Wuerttemberg).

The Environmentally Sensitive Grasslands in Germany cover all grasslands within the special areas for conservation (SACs) under the Habitats Directive, but excludes the grasslands in special protection areas (SPAs) under the Birds Directive.

- **Institutions and administrations**

Regional level.

Agriculture institutions. The district administrations are the regional administrative units for agriculture, which are subordinate to the regional councils. The district administrations are the institution for the submission of CAP funding applications and the control of measurements and farmers' commitments for both EU funding schemes such as Greening as well as for national/regional agricultural funds.

The district administrations offer online support and information on the different types of Greening measures and applications, and contact persons are named. Applications for EU funds are submitted through an online tool FIONA[15] (Flächeninformation und Online-Antrag [area information and online application]). It provides various information regarding the Greening and cross-compliance requirements.

Environmental institutions. Environmental administrations are also located in the district administrations. They control the implementation of the obligation in the protected areas, including on agricultural land. In general, the environmental administrations do not provide advice to farmers about on-farm environmental requirements. There are several environmental monitoring programs in Baden-Württemberg and the districts within the case study areas, such as the mapping of biotopes and habitats, including on agricultural areas. The effects on environmentally sensitive grasslands are assessed though mapping since 2010.

Farm advisory services.

Public support on CAP Greening requirements and measures is available through the district administrations, including online tools. Advisory services at farm level are offered by different regional offices for agriculture and rural areas, e.g. the Landesanstalt für Entwicklung Landwirtschaft und der ländlichen Räume Schwäbisch Gmünd.

Advisory services on CAP Greening are available also from non-public sources: For example, the national farmer association (Deutscher Bauernverband) runs an online tool[16] to calculate the payment based on the measures chosen at farm level.

Further advisory services are offered at regional scale by the farmer associations at federal state level (Landesbauernverband Baden-Württemberg) through so-called consultants. They are associated with different farmer associations at district level. Within the case study area, consultants are available in the district Zollernalb-Kreis. Advisory services by the regional farmer associations however is fee-based, the costs depend on the level of advice and range between 55€ per hour for control of payments and 215 € for filling of applications. If needed, a farm visit is possible to check that legal requirements of measures are met.

Other private advisory services are available through organic farming associations such as Beratungsdienste Ökologischer Landbau e.V., associated with the district administrations. These advisors focus on organic farming and give support with the online data entry tool FIONA as well as farm-based advices on payment schemes. This service is fee-based as well.

[15] http://www.fiona-antrag.de/
[16] http://www.bauernverband.de/praemienschaetzer

4.2. CAP Greening scheme implementation in Abstadt case study

The elements of the CAP Greening scheme apply to arable land over certain size (crop diversification on farms with land over 10 ha, ecologically focus area on land over 15 ha) and to permanent pastures of any size.

Arable land covers a third (36%) of the UAA in Albstadt case study area and the majority of it is in farms over 10 ha, indicating a high influence of the CAP Greening scheme on the management of arable land in the area.

Permanent pastures cover the largest share of the UAA – close to 64%. The area of permanent pastures in Albstadt has increased continuously at the expense of arable land (see point 2.1 Agriculture land use). The main objective of the CAP Greening scheme about permanent pastures is to maintain its existing area and preserve it from ploughing or conversion. Given the ongoing increase in the area of permanent pastures in Albstadt, the Greening scheme does not introduce new requirements or changes in their management in the area.

The total number of CAP Greening scheme beneficiaries in the case study area is 1,344 in 2016[17].

4.3. Interviewed farmers' participation in CAP Greening scheme.

The interviewed farmers in Albstadt case study area were ten. Seven had over 100 ha of UAA, and three had between 30 ha and 100 ha. All interviewed farmers had permanent grasslands (N=10), although one dedicated it to nature conservation areas. Eight had arable land, two had permanent crops and two had some forests as part of the farm. One farmer defined his farming system as arable and one as livestock farming with permanent pastures only. The others were all mixed farming systems (n=8), although some farmers stated livestock farming system with fodder production (n=3) and one had a biogas plant. The livestock breeding systems comprised cattle, pig fattening and poultry.

All of them were asked to state their participation in the different elements of the CAP Greening scheme.

- **Greening scheme: Permanent pastures**

All respondents implemented the permanent pastures element of the CAP Greening scheme. Nine respondents stated that part of their farm's permanent pastures were designated as environmentally sensitive grasslands, indicating that they were in Natura 2000 Special Areas for Conservation. Only one respondent indicated that his permanent pastures were not environmentally sensitive grasslands.

- **Greening scheme: Crop diversification**

The respondents implementing the crop diversification element were seven. The other respondent with arable land had less than 10 ha and thus this element did not apply to him. The number of crops grown on the farms was between six and 14 (Table 6). Wheat, corn,

[17] https://www.agrar-fischerei-zahlungen.de/Suche

barley and triticale seemed to be the dominant crops on respondents' farms. Lucerne and other fodder crops were also grown given the livestock/mixed farming systems of respondents.

Farmers' motivations for the crops' choice comprised a mixture of farm needs ("fodder for the animals"), income needs (testing of new markets – old varieties or exotic crops; or high cash markets – malting barley) and policy restrictions ("I am not allowed to use any plant protection products thus I do not grow grain peas"). All respondents had a higher number of crops than required by the Greening scheme (min 3 for areas above 30 ha). They explained that the Crops diversification element had no role in the decision about the number of crops on their farms.

Table 6. Crops grown on respondents' farms (n=7)

Crops	Respondents							no. respondents
	1	2	3	4	5	6	7	
wheat	x	x	x	x	x	x	x	7
corn		x	x	x	x	x	x	6
barley (winter and summer)		x	x		x	x	x	5
triticale			x	x	x	x	x	5
lucerne		x		x		x	x	4
fodder crops (different grasses)				x	x	x	x	4
rapeseed	x	x					x	3
peas			x	x			x	3
beans	x			x				2
red clover		x		x				2
oats			x				x	2
silphie				x	x			2
rye				x		x		2
sunflower				x				1
lentils	x							1
vetches						x		1
old variety of spelt	x							1
other crops	9							-
total no. of crops	**14**	**6**	**6**	**11**	**6**	**8**	**9**	**-**

Source: Farmers' survey

- **Greening scheme: Ecological focus areas**

According to the size of arable land, seven respondents implemented the EFA element. Their choices of EFA option were focused mostly on productive land uses – six had nitrogen-fixing crops, four had catch crops, and one had fallow land. There was one respondent with agro-forestry and one with strips along forests. There were different combinations between the EFA options in order to reach the required share for the farm. None of the respondents had chosen options from the Landscape Features.

The ecological focus areas were the element of the CAP Greening scheme expected to bring the highest new environmental benefits on arable land. Therefore, farmers' motivations for the EFA options choice is of particular interest for the assessment of the scheme effectiveness.

Interviewed farmers were asked to assess seven statements about their motivations for EFA choice using Likert scale, where 5 stands for strongly agree; 4 – somewhat agree; 3 – neutral; 2 – somewhat disagree; and 1 – strongly disagree.

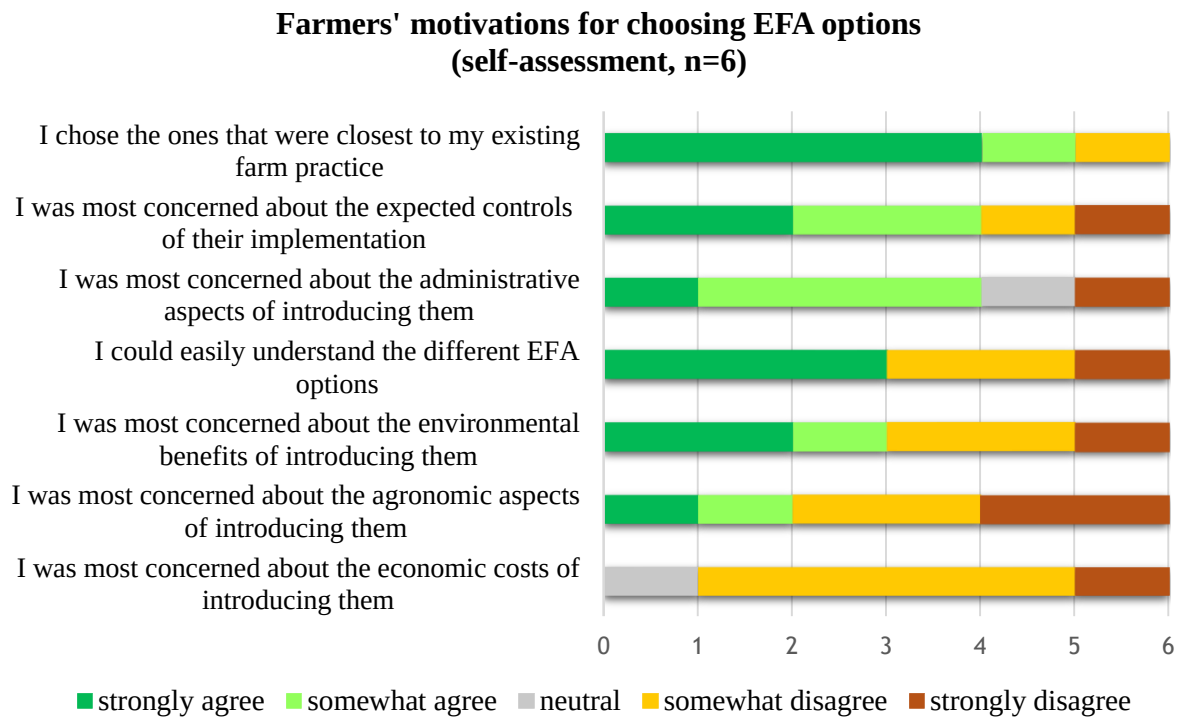


Figure 7. Farmers' self-assessment of motivations for choosing EFA options

Respondents' main motivation for the choice of EFA option was minimum disturbance in the farm operations by selecting the options closest to their existing practices (Figure 7). One farmer explained that he opted for lucerne and red clover, which he could use for fodder production as well as for sorting out problematic sites on the farm. Another respondent explained that he chose the options where "as little as possible material is lost for the biogas plant – lucerne at the edge of a forest". The possibility of combining protein crops with agri-environmental scheme (FAKT) was another motivation in this group.

The administrative burden of introducing the EFA option and the expected controls of the implementation represented the second group of key motivations. Farmers' concerns related to the lack of clarity about "what should happen with EFAs. It has been a bit more effort because you had to work with given dates instead of using the appropriate weather". Questions and concerns about the measures and deligneation of EFA sites dominated the EFA choices: "I questioned myself if the area was measured right" and "measurements were not clear". Furthermore, farmers expected that the measuring problem would be highest with landscape elements: "risk of controls and of errors when measuring landscape elements is too high"; "some elements I did not register at all because of the controls and sanctions, though they were eligible".

The economic costs of the introduction of EFA options was the least concern for the respondents in Albstadt case study area, probably because they opted mostly for practices compatible with their existing farm operations and with lowest risks of sanctions.

Stakeholders' perspectives on farmers' motivations for EFA choice

Interviewed stakeholders were asked to assess the same seven statements, using the same Likert scale. The difference was that stakeholders assessed the EFA choice motivations of farmers in the case study area in general.

Stakeholders' perceptions of farmers' motivations reflected the top three motivations stated by farmers – the concerns about administrative burden and expected controls as well as the choice of EFA options closest to the existing farm practices (Figure 8). Furthermore, their assessment of the low importance of the economic concerns about the introduction of EFA options also coincided with the farmers' self-assessment.

Stakeholders explained that the key administrative burden was not the application itself because it was submitted with the "common application". The concerns resulted from requirements such as "the need to keep records of the seeding mixtures for 5 years"; "green cover needs to be included in the application before it is seeded, when the conditions at the time of seeding are not known. Farmers cannot change anything afterwards despite the problems that usually arise."

The concerns about the expected controls related to the "fear of reduced payments in case of errors, so farmers decided to do more than the 5% in the first year to be sure to fulfil the requirement"; "farmers planned for a buffer above the 5% so that in case of objections they still had enough EFA".

Stakeholders explained that Landscape Features were largely not chosen because "they have only a small area". This combined with the fear of correct measurements/deligneation in the system prevented farmers from declaring them.

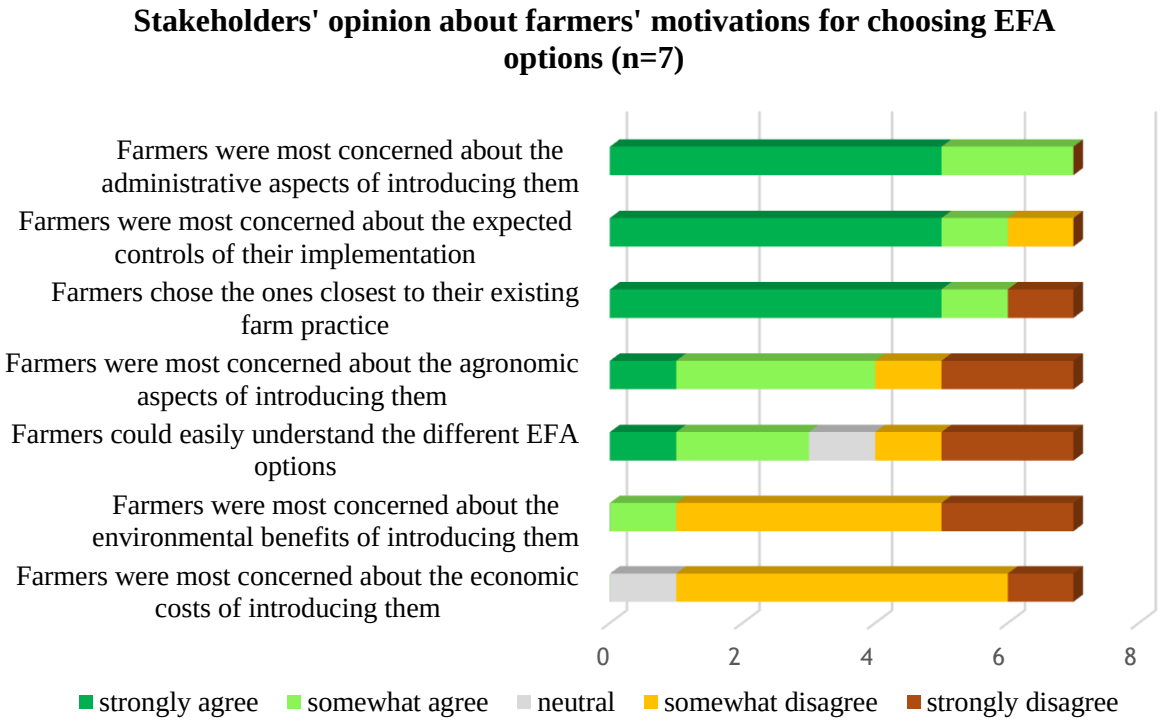


Figure 8. Stakeholders' assessment of farmers' motivations for choosing EFA options (n=7)

4.4. Changes resulting from the implementation of CAP Greening scheme

Farmers and stakeholders were asked to assess potential environmental, economic and administrative improvements resulting from CAP Greening scheme implementation based on their experiences and observations. There were seven statements, which farmers assessed for their own farms, and stakeholders for the case study area. Likert assessment scale was used: 5-strongly agree, 4-somewhat agree, 3-neutral, 2-somewhat disagree, 1-strongly disagree.

- **Farmers' assessment of Greening scheme implementation on farms**

Administrative implementation and controls. The top change from the beginning of Greening implementation on farms was farmers' increased understanding about the controls of the different elements (Figure 9). This reflected one of the key concerns described above about the measurement of EFA elements and meeting the 5% requirement.

At the same time, the administrative aspects of Greening implementation and the bureaucracy related to it remained problematic for farmers. They recognised that the application itself was not an issue, because of the "common application" with the basic payment scheme ("the main scheme"). However, the need to maintain and keep records of the pesticides and fertilizers use and to observe certain dates and deadlines was seen as an obstacle by some respondents. One farmer described it: "There are certain dates for farming; we can't work with nature anymore. We need more flexibility; the dates should depend on the region."

Environmental perspective. The next two statements for which there was more agreement than disagreement (although on the edge) related to improved soil conditions and biodiversity

on farms. The positive examples farmers provided relate to more areas with nitrogen-fixing crops and cover crops, which were good for soil; as well as the higher presence of insects mostly on lucerne and red clover, and more flowering areas, which were good for biodiversity. However, statements such as "no big difference", "no change, we always had a lot of flowering areas" and "maybe more mixtures, but not necessarily because of Greening" were also present. Seven (of the ten) interviewed farmers implemented also an agri-environmental measure, therefore, it was not easy to separate the soil or biodiversity benefits of CAP Greening scheme and the agri-environmental measure.

On the negative side, farmers complained about the weed seeds self-planting on parcels next to parcels with fallow land and flowering mixtures. Farmers said that "soil activity increases, but at the same time, there is much pressure from weeds" and "seeds from colleague's fallow land result in increased herbicide use on my fields". Thus, the statement about the overall environmental improvement on farms received more neutral and disagreement assessments.

Economic perspective. The economic returns and costs for CAP Greening scheme implementation were assessed in two separate statements – «the economic returns from implementation are worth the costs and efforts», and «the costs of implementation are reducing». Both generated more disagreement than agreement. The main disagreements related to the loss of productive land for EFA ("no yields from lucerne parcels, therefore the economic situation worsens") or the restriction to use plant protection products on protein crops, which led to less yields. On the positive side, some respondents recognised that "I need less N-fertilizers because of the legumes", "perennial crops are good; less costs and I can use them for my animals" and "silphie has high starting costs, but then doesn't need any investments for a few years!".

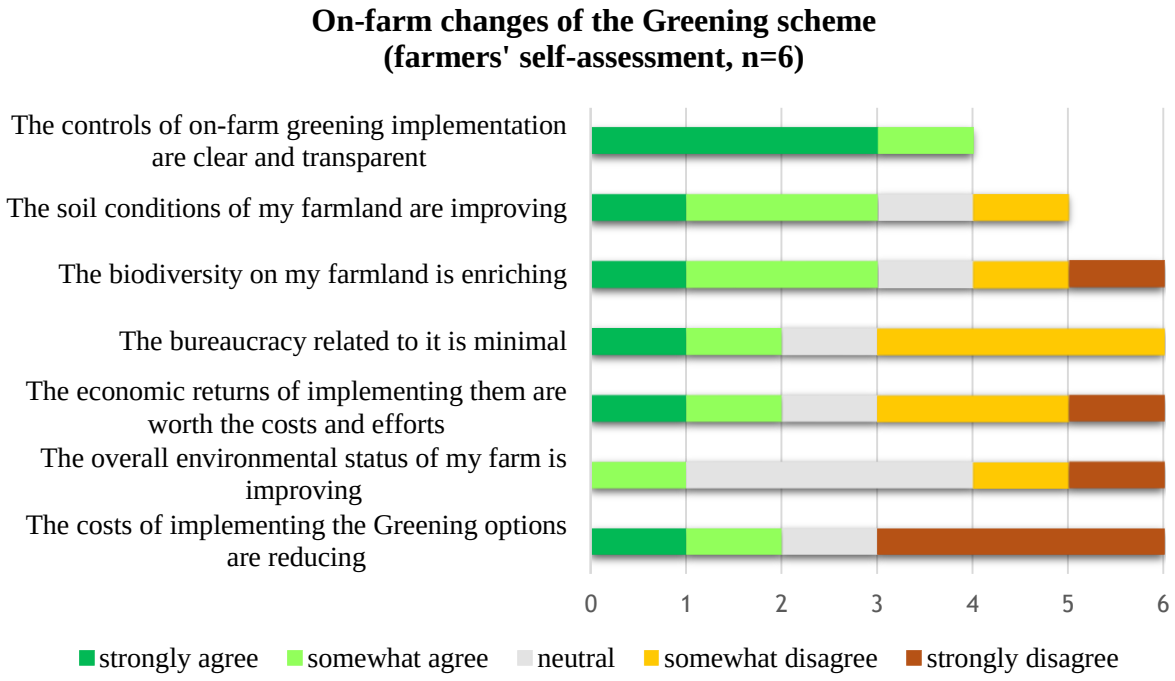


Figure 9. Farmers' assessment of on-farm changes resulting from CAP Greening scheme

- **Stakeholders' assessment of CAP Greening scheme implementation in the region**

Environmental perspective. The top two changes in the case study area from stakeholders' perspectives related to an improved overall environmental situation and enhanced biodiversity on farms. The main benefits resulted from crop diversification whereby cereals and rapeseed was already accompanied by other crops and "fallow land on marginal areas". At the same time, the restriction for the use of plant protection products resulted in less protein crops.

The other benefits were linked to the increase in flowering areas and cover crops. However, stakeholders indicated weaknesses of both flowering areas and cover crops. Overall, flowering areas were considered positive, but there was "more intensive use of other grasslands". Stakeholders confirmed the issue raised by farmer-respondents with seeds from flowering areas both on neighbouring parcels and follow-up use of flowering parcel as arable area – "they need more herbicides or manual effort...more difficult plants, neophytes and nematods".

Cover crops were considered as beneficial for "soil structure through less erosion and reduced run-off from nitrate". However, there was a "reduction in the area of stubble fields on arable land due to the introduction of cover crops". Another issue related to cover crops was the weather aspect – "the time when cultivation of the soil is allowed might not be appropriate – frost vs. wet soil".

Administrative implementation and controls. Stakeholders, unlike farmers, disagreed with the statement that «controls are clear and transparent». One stakeholder said, "There are still uncertainties regarding the controls, especially with measurements; but farmers got used to the administrative procedure". Other stakeholders added that "controls are getting more" and "the fear of sanctions and controls is still there!".

The statement «bureaucracy is minimal» received the highest disagreement by stakeholders. Overall, they said that "simplification of the administrative side would be absolutely necessary!", and that "farmers got used to the administrative burden, but it is not getting better." The negative aspects comprised the "time and effort for the application…", "different factors need to be calculated, documentation of measures", "very rigid and inflexible dates and regulations".

Economic perspective. Stakeholders disagreed that the economic aspects in terms of costs of implementation and economic returns have improved since the beginning of CAP Greening scheme implementation. The main issue from stakeholders' perspective was the lack of production on minimum 5% of the arable land – "so from economic point of view only negative", "only costs, no production", and "there is a decreasing economic profit when parcels are used too extensively". Furthermore, there were "financial costs and effort for bureaucracy, as well as for practical implementation even when the weather conditions are not suitable".

The positive economic aspects as explained by stakeholders related to "legumes, which due to their characteristics have economically positive effect".

Overall, the interviewed stakeholders had a more negative assessment of the administrative and economic changes of the Greening scheme in comparison to the interviewed farmers, and similar assessment of the environmental changes resulting from Greening.

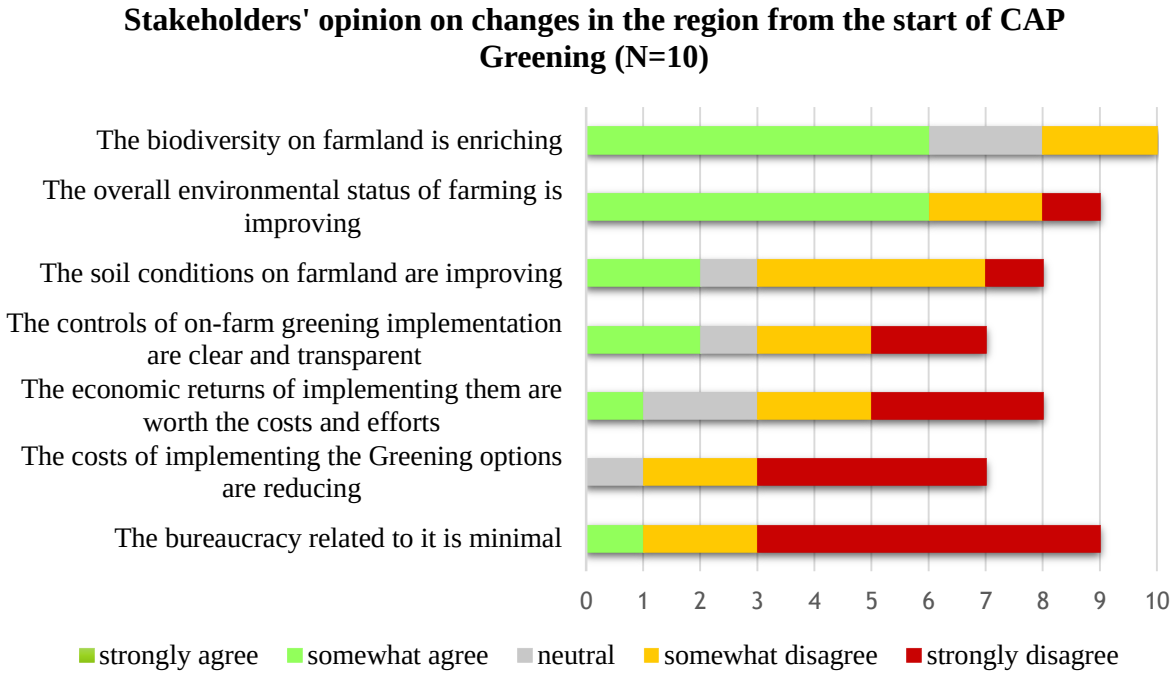


Figure 10. Stakeholders' assessment of Greening scheme implementation in the region

- **Long-term changes on farms as a result of Greening**

Farmers were asked if CAP Greening scheme implementation led to long-term changes on their farms (Figure 11); stakeholders had to respond about all farms in the case study area (Figure 12).

Farmers were less positive about longer-term changes in their farm management practices due to CAP Greening scheme implementation. On the one hand, this was due to their statements that they had most of the elements even before CAP Greening. On the other hand, they complied with the policy requirements: "as long as these political requirements persist, I will continue planting 10% of legumes"; indicating that when policy requirements would change, they would change with them.

Stakeholders recognised that "this is difficult to evaluate" and that "farmers implement Greening because they have to…". At the same time, there were "more crops and cover crops", "more newly introduced flowering areas", but in general "a reverse trend" was expected when the new regulations come into force.

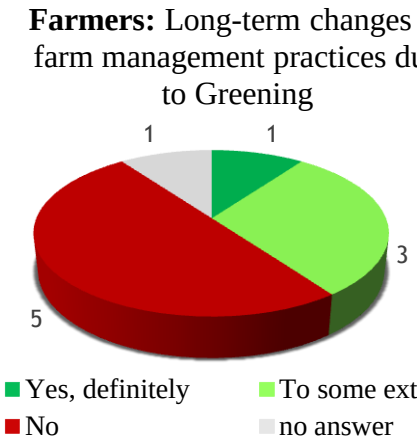


Figure 11. Farmers assessment of long-term changes on their farms due to Greening (no. of respondents)

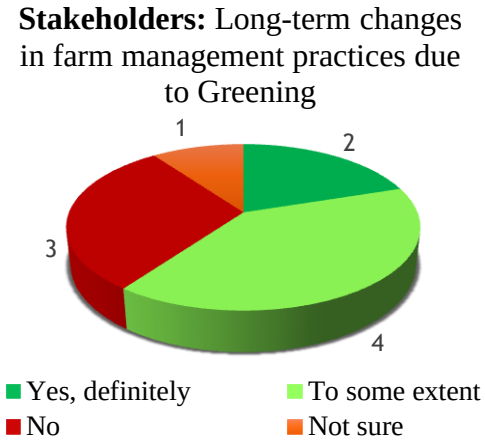


Figure 12. Stakeholders assessment of long-term changes on farms in the CS area due to Greening (no. of respondents)

4.5. Implementation of other CAP environmental measures

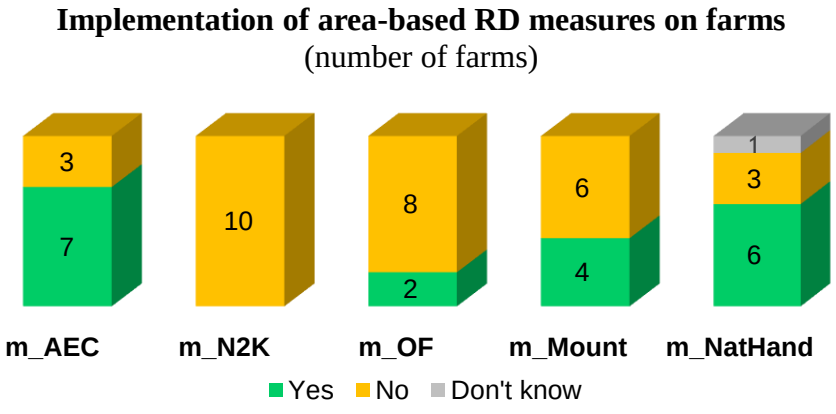
We asked farmers if they participated in other environment-related CAP measures and the similarities and/or differences they could find between CAP Greening and the other measures.

- **Rural development measures**

Seven farmers participated in the agri-environmental and climate measure (FAKT), six received compensatory payments for areas with natural handicaps and four for mountainous areas, and two were in the organic farming measure (Figure 13).

Some respondents considered that the green cover measures in CAP Greening scheme and FAKT were the same; and that the efforts for implementing them were similar. Others thought, "Greening is more complicated"; depending on "whether one has hedges, buffer strips and trees, because it requires higher administrative efforts".

The compensatory measures for areas with natural handicaps or mountainous areas were considered easier, because they "apply to the entire area", "do not need such a detailed documentation" and the "payments are a large financial aspect".



Legend: **m-AEC**: agri-environment and climate measure; **m_N2K**: Natura 2000 compensatory measure; **m_OF**: organic farming measure; **m_Mount**: Compensatory payments for mountainous areas; **m_NatHand**: Compensatory payments for areas with natural handcaps

Figure 13. Respondents participation in environment-related area-based rural development measures (N=10, no. of respondents)

Stakeholders also responded to the question of similarities and differences between CAP Greening scheme and area-based rural development measures. They explained that the application for all measures was comparable because it was done via the "common application". From environmental point of view, "there is a tight linkage of the ecological effects from Greening and FAKT". Additionally, "both the Baden-Württemberg programme and Greening have some sort of diversification of crop rotation". However, one stakeholder said, "In general, many valuable goals of the measures are disconnected from actual agricultural practice because the constraints are so strict, and there is too little flexibility".

The differences observed by stakeholders related mostly to the FAKT measure and CAP Greening scheme.

At the level of **programme objectives**, the "goals of the federal programme FAKT are higher and more targeted", it also allowed "regional adaptation at least to some extent". Furthermore, FAKT measure was "more relevant at area scale, because Greening is only relevant for arable land and not for all farming systems, eg. green-by-definition farmers".

Administratively, the "commitment under FAKT is for 5 years, while Greening is more flexible because it changes every year". At the same time, "there is a higher acceptance for FAKT from farmers, because they "can" and don't "have to"".

Other important differences related to the **management requirements**: "different timeframes or dates during which measures are allowed or not, for example ploughing or mowing dates in Greening and FAKT"; and "different requirements for the cultivation of fodder legumes in FAKT and Greening".

Economically, the payment levels were also very different, "especially regarding grasslands". There were "different payment schemes, depending on the type of combination of different measures, e.g. fallow land as flowering area in FAKT is 700€/ha, in Greening only 300€/ha".

- **Assessment of CAP schemes or measures appropriateness to address the environmental objectives on farmlands in the case study area**

Both farmers and stakeholders were asked to assess from their own perspective which CAP scheme or measure was most appropriate to address the environmental objectives on farmland in the case study area. Both groups put at the top the rural development measures – agri-environment and climate and organic farming. The Pillar I schemes – the Basic Payment and Greening, come second. Cross-compliance is last in both rankings.

Table 7. Respondents' ranking of the CAP schemes or measures that are most appropriate to meet environmental objectives on farmland.

Farmers' ranking		Stakeholders' ranking
1. Agri-environment measure		1. Organic farming measure
2. Organic farming measure		2. Agri-environment measure
3. Basic Payment Scheme		3. Greening scheme
4. Greening scheme		4. Basic Payment Scheme
5. Cross Compliance		5. Cross Compliance

Farmers' comments on ranking. Despite the ranking results, the comments accompanying them were not unidirectional. Some farmers said that "FAKT is not really targeted enough at the moment" and that "if FAKT should make sense, flowering areas should not be mulched/mown too early". Furthermore, their reserves about organic farming varied from "organic farming is not a panacea", to "some measures in organic farming are not very ecological" and it "might not be the best for achieving environmental targets". They were also concerned that "organic farming doesn't work everywhere" and "there are some "black sheep" among organic farmers who only do so because of high profits". Overall, farmers considered that "organic farming is only valid if done right".

Farmers opinion about the Basic Payment Scheme was that it was "the basis, and is equally important as FAKT" as well as that it was "necessary from an economic point of view". However, one farmer thought that "it will break off in the long run".

Farmers considered "cross compliance is a rule work from good agriculture practice" and it was "standards linked to the basic payment scheme". At the same time "cross-compliance causes only costs and high degree of administration; sanctions on farms with animals have an effect on the basic payment scheme as well, which is quite unfair because farms without animals are better off in the end".

Stakeholders' comments on ranking. Some stakeholders' comments were explicit "none of these measures is effective when it comes to environmental goals!", "basic payment scheme is the basis for everything!", or "cross-compliance is only administration and costs, should be eliminated!".

Others were more graded "agri-environmental measures have largest effect at area scale" and "the regional agri-environmental measures are more precise and relevant for individual cases". "Organic farming has greatest effect due to the diversity of crops used, but it is not "green" per se, it can be very intensive too" and its effect "depends on the market, especially for hay and milk".

Stakeholders' commented the benefits of CAP Greening scheme for environmental goals as "increased areas of legumes and flowering areas" and its weaknesses were that it could also be "like a watering can"[18]. Overall, "it would be necessary to differentiate between the different CAP Greening elements, not all of them are equally valuable". The comment about the BPS was that it formed the basis but "without effect" for environmental goals.

[18] There is no differentiation, everyone is doing the same thing as it seems to be fitting for everyone and everywhere.

Stakeholders considered cross-compliance as “an abstract construction, which serves only as a control mechanism”.

4.6. Training and advice on CAP Greening scheme

CAP Greening scheme introduced both new requirements about farmland management and new approach to claiming Pillar I subsidies. We asked farmers whether they received training on Greening or EFA option, which were their sources of information and advice about the CAP schemes and measures, and the environmental aspects of farming. Stakeholders were asked if their organisations provided training and/or advice on environmental aspects of farming and Greening to farmers.

Farmers’ perspectives. Four of the ten interviewed farmers received information about the Greening scheme, either at the time of preparation of the joint application or during an information event in the agriculture office. Overall, the agricultural offices were the main source of information and advice both on CAP schemes and measures and on environmental aspects of farming for the interviewed farmers. Specialised journals or newsletters of farmers’ associations were the second most used source of information for farmers. Internet came in third place.

Farmers’ preferred form of advice was farm visits focused on practical farm needs. Potential visits to colleagues’ farms were also an option. An important note was that the advice from the agriculture offices was mostly focused on controls while farmers also needed practical advice.

Stakeholders’ perspectives. Four of the ten interviewed stakeholders responded that their organisations provided information and/or advice to farmers about CAP Greening scheme. The agriculture offices had “always information events in the beginning of the application period for the joint application (Greening), and close to the end of the application period there are some individual appointments (either personal or by phone) for last questions”. Furthermore, “the agricultural authorities are important because they have first-hand information”. Stakeholders recognised that “digital/online information is getting more important for young farmers”.

The advisory services about environmental aspects were not straightforward. Some stakeholders said, “Nature conservation advisory services are not really asked for”. Others had a different perspective: “farmers think about nature conservation, but this topic is "poisoned" through bureaucracy and idealism; the standpoints are often very rigid”. Some had even stricter perspective: “advisory services in environmental context are difficult, often ideological, depending on the person. Farmers would rather not contact any NGOs since it is difficult to discuss with them, there are different goals”.

4.7. Involvement in national level decision-making about CAP Greening scheme

Both farmers and stakeholders were asked if they were involved in the consultation or decision-making about Greening in 2014. There was one respondent per group that was involved (one farmer and one stakeholder). The farmer was a member of the management board of a local farmers' association where they discussed the Greening options. The stakeholder was involved only informally. Another stakeholder commented that some of his "colleagues participated in the discussions about the FAKT measure, but Greening was discussed at the ministry level".

Further to the question of direct involvement, farmers were asked if they were aware of other organisations that were involved in consulation of decision-making. Most farmers thought that farmers' associations were involved (Figure 14). Some farmers thought that environmental NGOs were also involved. In general, farmers were not aware if local level authorities or experts have been involved in decision making about CAP Greening scheme.

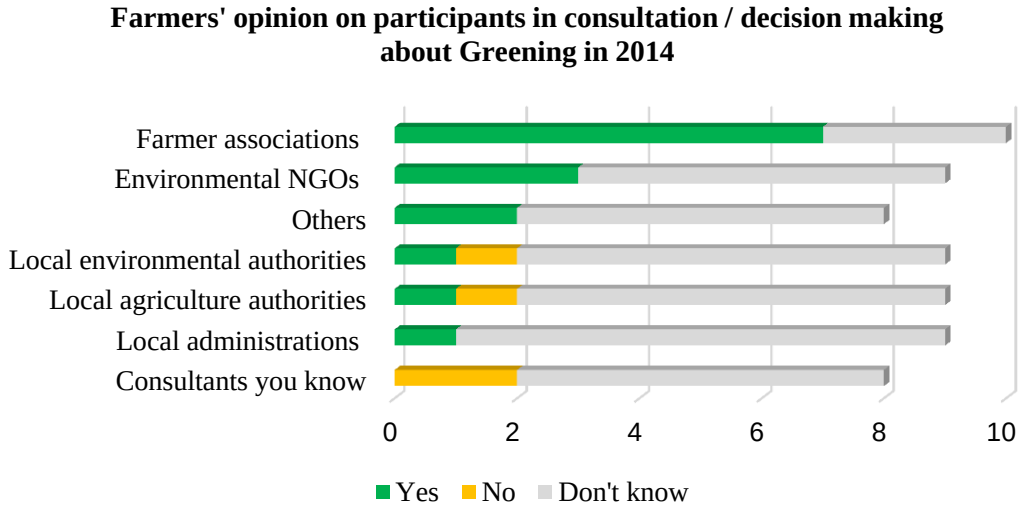


Figure 14. Farmers' awareness about local participation in the CAP Greening decision-making in 2014 (N=10)

5. Conclusions from BIOGEA findings in Albstadt case study area

Albstadt is the extensive land use case study area under the BIOGEA project in Germany. The agricultural land is dominated by permanent pastures (over 60%), which is continuously increasing at the expense of decreasing share of arable land. The farming systems characterising the case study area are arable farming, livestock farming and mixed farming systems.

GBI features and elements in Albstadt case study area

- Albstadt has medium to high presence of GBI elements according to the biodiversity monitoring under BIOGEA project. The main connectivity GBI elements comprise grassy and, especially, woody strips (hedges), and streams and ditches were also present. Main in-field elements were N-fixing crops followed by perennial crops. Solitary trees and groups of trees are abundant. Most land is forested or grassland.

  The most recommend as potentially valuable "greening" options, according to the biodiversity-GBI modelling, are the promotion of crop diversification to favour steppe birds, and the promotion of grassland, maintenance of isolated trees and agroforestry, and preventing field size enlargement to support plant richness, overall bird diversity and/or threatened (non-farmland) bird species.

Farmers and stakeholders' awareness about GBI

- The interviews with farmers and local stakeholder revealed that neither group was aware about the GBI terminology – only one environmental stakeholder was certain about the GBI term, two stakeholders and one farmer were aware to some extent. All other stakeholders and farmers were not aware about it.
- At the same time, when the GBI elements and features were named, stakeholders' recognised between 15 and 18 (mean value of 17) GBI in the case study area, supporting the biodiversity monitoring finding of high presence of GBI types.
- Interviewed farmers recognised between 7 and 12 (mean value of 9) GBI elements and features on their farms. All farmers had permanent pastures and grasslands, trees in groups and field corpses. All but one had hedges and wooded strips, and isolated trees. Cover crops and nitrogen-fixing crops weare also present on respondents' farms.

CAP Greening scheme in Albstadt case study area

- The elements of the CAP Greening scheme are widely applicable to the utilised agricultural area in Albstadt. The farms with no land management requirement under Greening represent a small share in overall UAA – farms under 10 ha manage only 3% of the UAA, and permanent crops cover 0.2% of the UAA.

Permanent pastures.

- The Permanent pasture element aims to preserve quantitatively the territory and prevent the decrease of the share of permanent pastures at national level. It is easily implemented in Albstadt where the share of permanent pastures is continuously increasing at the expense of arable land. Germany makes use of the "ploughing-up criterion" within the Omnibus regulation, which means that permanent grassland is defined by not having been ploughed for five consecutive years.
- The qualitative aspect of the Greening permanent pastures element is represented by the requirement to identify the environmentally sensitive grasslands (ESG) within Natura 2000 areas under the Habitat directive (FFH areas in Germany). The Albstadt case study area has 25 FFH areas and the permanent pastures within them are identified as ESG, if the FFH as well as the grassland existed before 1st Jan 2015. The national law is that the ESG are not going to be ploughed or converted to other uses.
- Any other management measures related to the quality of permanent pastures within and outside Natura 2000 areas are supported by instruments outside CAP Greening – Natura 2000 management plans, regional programmes, agri-environmental measures.

Crop diversification.

- The crop diversification element requires minimum two crops on farms with more than 10 ha of arable land and a minimum of three crops on farms with over 30 ha of arable land. Both the interviewed farmers and stakeholders state that the crop diversity in the case study area is varied enough and this element has no significant impact on the number of crops grown.
- The interviewed farmers reveal that the number of crops grown on their farms is between six and forteen. The change in the type of crops whereby more legumes and flowering areas are reported is due to the EFA requirement.

EFA element.

- The EFA element in Greening requires that minimum 5% of the arable land over 15 ha is dedicated to ecologically focused areas. Germany has one of the most extensive lists of EFA options for farmers, covering 18 different options. In the federal state of Baden Württemberg 11 options are available, with all landscape elements included in cross compliance being counted as one single option[19].
- The interviewed farmers' choices of EFA options group around nitrogen-fixing crops, cover crops and fallow land. Individual respondents opted for agro-forestry and strips along forest.

[19] https://www.landwirtschaft-bw.info/pb/MLR.Foerderung,Len/Startseite/Gemeinsamer+Antrag/Oekologische+Vorrangflaechen

- The respondents' main concerns at the introduction of EFA element were related to minimum disturbance of existing farming practices and avoiding the risk of penalties in case of non-compliance. Thus, respondents in mixed farming opted for crops that can be used as fodder for their animals. Additionally, protein crops were considered big win initially, given the possibility to combine CAP Greening scheme and FAKT agri-environmental measure. However, after the prohibition of the use of plant protection substances farmers opted out, due to the reduced yields.
- The interviews with farmers and stakeholders reveal two main approaches for dealing with the EFA penalty risk minimisation. One of the approaches is to avoid the delineation and declaration of landscape elements. Landscape elements are considered very small, which increases the risk of delineation and follow up measurement mistakes. The other approach is to dedicate larger areas (more than the 5% requirement), usually in productive use, and if possible on marginal plots (from agriculture perspective). In this way, even if there are measurement mistakes, there would be enough EFA dedicated areas on the one hand; and on the other, the land would still be used for production even if more extensive production.

Implementation of the Greening scheme.

- The interviews with farmers and local stakeholders indicate that three years after the start of the Greening scheme, there is more clarity and understanding about the administrative and control issues. However, they are not getting easier or less bureaucratic. One source of significant concern is the fixed dates for doing agronomic activities under certain EFA options, irrespective of weather conditions ("frost vs. wet soil").
- Both farmers and stakeholders indicate some improvement in the farms'environmental conditions, soil or biodiversity improvement. However, all base their assessments on personal observations, and many doubt that the improvements are due to the CAP Greening scheme. There is no monitoring of environmental effect of the Greening scheme implementation and statements that "legumes are good for soil structure" arise from general wisdom, not from specific data about Greening implementation.
- Economically, neither the interviewed farmers nor the interviewed stakeholders indicate the CAP Greening payment as an important aspect of farms' financial situations. Their expressed concerns seem to group around receiving the BPS payment and the loss of income from the land dedicated to EFA.
- Longer-term changes in land management practices because of Greening implementation are not very likely according to the interviewed farmers and stakeholders. On the one hand, this is because farmer-respondents already had a varied crop diversity; and EFA implementation in its current form is purely for complying with policy requirements. On the other hand, respondents are more in favour of the implementation of agri-environmental or organic farming measures for achieving environmental goals. They are considered more focused and adapted to the region's needs and conditions, as well as provide higher payment levels.

Training, advice and consultation on CAP Greening scheme

- There are many institutions and organisations, from the public and private sector, at regional and local level, providing consultation, advice and training to farmers.
- At the same time, the access to practical and understandable information and advice about the environmental aspects of farming, including Greening elements implementation, remains problematic.
- Interviewed farmers rely on agriculture offices, specialised journals and Internet for environmental information about their farms. However, the information provided by the agriculture office often is focused on the application process, administrative records and control issues, rather than practical farm-related issues. The information published in journals needs to be adapted to be used by the individual farmers.
- Thus, farmers preferred options for advice and consultation is on-farm visits or visits on neighbouring farms where they can discuss specific issues and targeted/adapted solutions.
- Interviewed stakeholders indicate for certain tension between farmers and nature conservation. Some think that "nature conservation advisory services are not asked for". Others find that "advisory service in environmental context are difficult, often ideological, depending on the person…"

Participation in CAP Greening decision making.

- The participation in the CAP Greening decision making by the interviewed farmers and stakeholders is limited. One farmer participated in his farmer association internal discussions, and one stakeholder was involved informally. All indicate that decisions were taken at national level.
- Interviewed farmers think that the participants in the national level decision making were farmers' associations and some think that environmental NGOs were involved. Overall, farmers are not aware if local administration and institutions were involved.