BIOGEA
Testing BIOdiversity Gain of European Agriculture with CAP greening

CAP Greening: Learning from the Local Level

Case study report:

Western Stara Planina, Bulgaria



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: Western Stara Planina, Bulgaria

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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.

Western Stara Planina is the extensive land use case study area in Bulgaria under the BIOGEA project. Biodiversity data was collected in the period April 2017 – September 2018. Case study agriculture and policy data for and from the region was collected in the period November 2017 – April 2018.

Meetings and interviews with local farmers, administrators, advisers and NGOs' representatives in Western Stara Planina were organised in the period April-May 2018. A stakeholders' round-table to discuss the preliminary findings of our case study was organized in September 2018. The current report systemizes the findings and conclusions from these activities.

- **Interviewed stakeholders**

The local stakeholders and experts (N=8) were interviewed in the period 11 April – 18 May 2018. Eight local stakeholders shared their views and experiences: representatives of local/regional agriculture authorities (n=5), local/regional environmental authorities (n=1) and farm advisors (n=2).

- **Interviewed farmers**

The farmers (N=21) were interviewed in the period 11 April – 18 May 2018. Ten farmers are in mixed farming, seven in arable farming and four in livestock farming. Most interviewed farmers (n=12) had farms with land between 30 ha and 100 ha. Eight farmers had over 100 ha of land. One was in the farm size group 10-30 ha.

2. Western Stara Planina case study area

Western Stara Planina case study area is located in the mountains in North-Western Bulgaria at the border with Serbia. It covers 1662 km^2 and five municipalities (LAU 1 level) – Berkovitsa, Chiprovtsi, Georgi Damyanovo, Godech and Varshets from two NUTS III regions – Montana and Sofia-district. The territory is situated both on the Southern slopes of the mountains (Godech municipality from Sofia district) and on the Northern slopes (Berkovitsa, Chiprovtsi, Georgi Damyanovo and Varshets from Montana district). The nearest urban centers are Sofia to the south (50 km from Godech) and Montana to the north with an average distance to the municipal centers of 28 km. The five municipalities are rural areas according to the national definition[1].

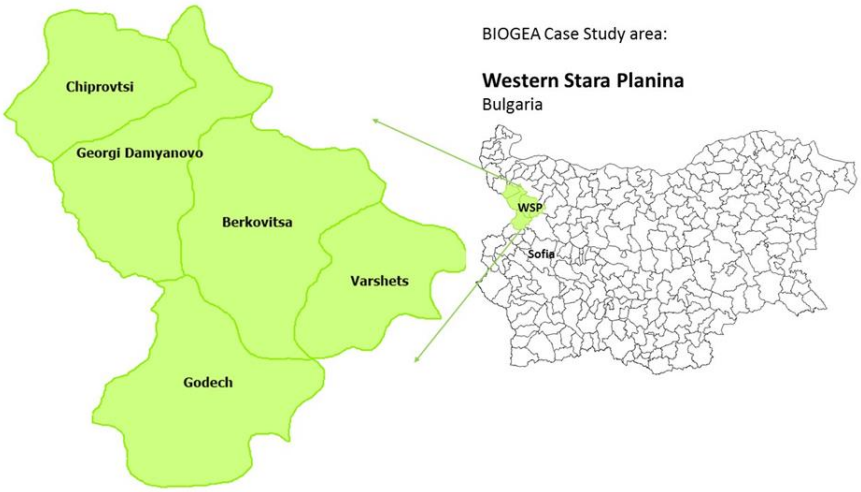


Figure 1. Location of Western Stara planina case study area in Bulgaria

In 2017, the population was 34,273 people. The population trend is negative for decades - it decreased by -27% for 15 years (NSI, 2018). The population density was 20.6 people/km^2 in 2017, down from 21.5 people/km^2 in 2016, revealing a very rapid population decrease. At the same time, the share of population in working age and in above working age was 51-53% and 35-33%, respectively, for the same 15-year period. Thus, the case study area is characterized by a stable trend of decreasing population and continuously reducing work force.

The importance of the agriculture sector is represented both by the high share of agriculture land and by the number of people engaged in agricultural activities – 6,220 in 2010[2] (21% of the people in working and above-working age in the same year). The other sectors of importance in the case study area are forestry, light industry, services and tourism.

The area is predominantly mountainous and CORINE Land Cover 2012 shows that forests and scrubland represent 57.4% of the land (Figure 2). Agricultural land, including natural grasslands, represents 39.3%. Wetlands and water bodies cover only 0.3%, while the artificial surfaces – 3.0%.

[1] Rural areas in Bulgaria are defined as "municipalities in which there is no settlement with more than 30,000 people".
[2] Agriculture Census 2010 data.

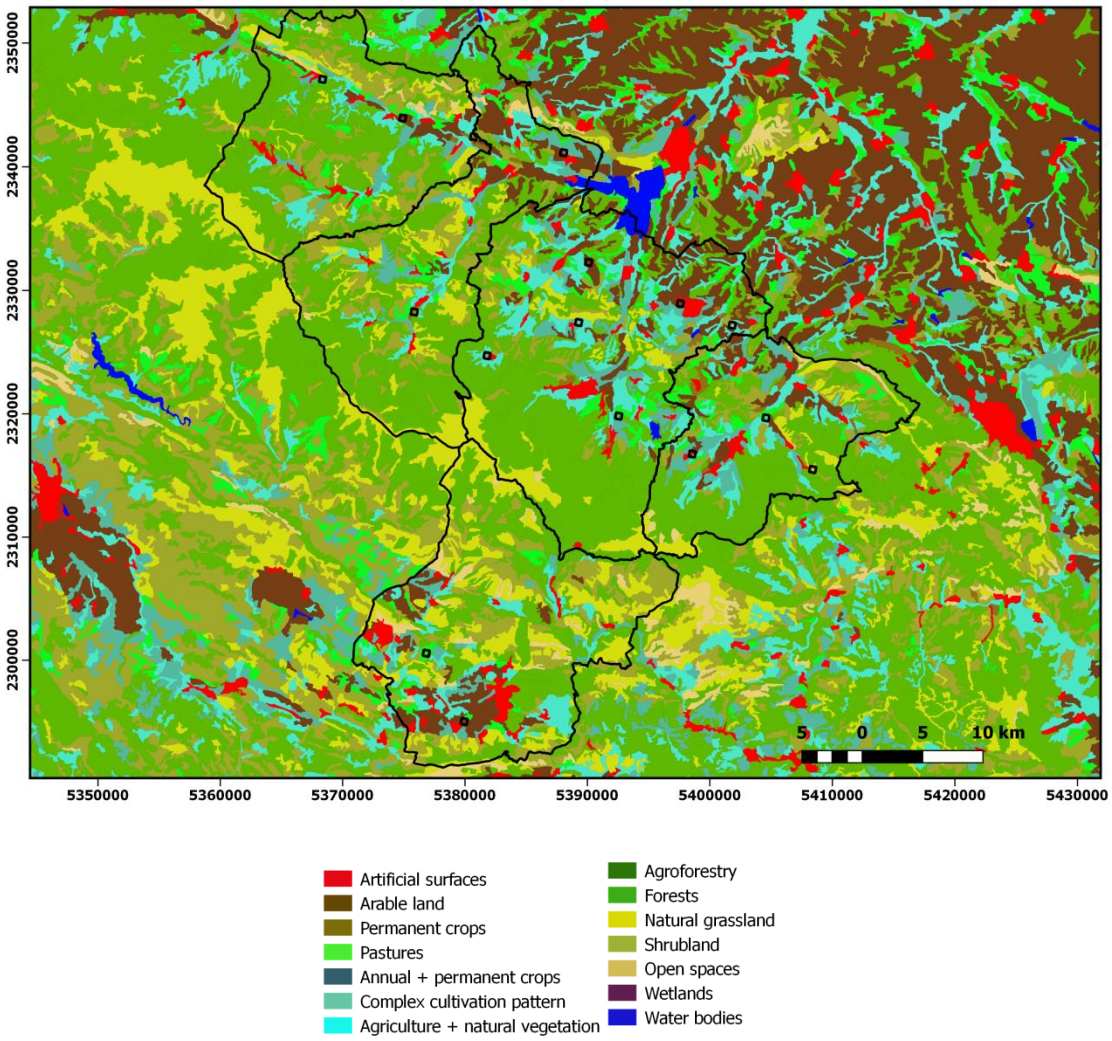


Figure 2. Location of study plots in Western Stara Planina region and CORINE land cover categories

2.1.Agriculture land use

The National Statistics Institute reports 78,919 ha of agriculture land in the case study area (NSI, 2016), which includes land in active use, abandoned land, buildings for agriculture use, etc. The Agriculture Census in 2010 reported 13,545 ha of UAA in the five municipalities. This was only the land that was used by farm holdings at the time of the census but excluded the used common grasslands.

The Land Parcel Identification System (LPIS) reveals that in 2017 the utilised agricultural area (UAA) in the case study area was 49,291 ha, of which 65% is eligible for CAP support (Table 1). The LPIS includes the physical blocks of agricultural land that are in good agriculture conditions and the parts of them that are eligible for support by the CAP schemes and measures. Therefore, the local-level implementation of CAP Greening scheme concerns only the agriculture land in LPIS that is eligible for support – 32,027 ha.

Table 1. Agriculture land use in Western Stara Planina case study area

Land use	Agriculture Census 2010	LPIS 2017		
		All UAA in physical blocks	Eligible UAA	Share (%) Eligible/All
UAA - total	**13,545**	**49,291**	**32,027**	**65**
Arable land	3,968	4,785	4,510	94
Mixed landuse	-	9,890	6,570	66
Permanent grasslands	9,173*	34,040	20,512	60
Permanent crops	318	577	435	75
Other agri land	86	-	-	

* This figure excludes the common pastures used by farmers in 2010.

Source: Own calculations on the basis of Agriculture Census report 2010, and LPIS land eligibility layer published online in December 2017

Agricultural land eligible for CAP support in Western Stara Planina

The largest area of agriculture land eligible for support in Western Stara Planina is covered by permanent pastures – 20,521 ha (64%). The Bulgarian CAP Greening scheme requirement for it is to maintain its size at national level, which in practice means no direct local-level requirements. At the same time, this requirement indicates that there should be no further loss of permanent pasture due to abandonment, overgrowth by scrub or trees or conversion to arable land.

The second size group of agriculture land eligible for support is the one of mixed land use – 6,570 ha (21% of all eligible land). This category comprises physical blocks of agriculture land that have many different land uses and none is dominant in the physical block. This characteristic suggests that, most likely, the land in this category is considered green-by-

definition due to its small size[3] (< 10 ha) and thus can receive the CAP Greening payment without changes in the management.

The third group is arable land – 4,510 ha (14% of all eligible land). There are two CAP Greening scheme requirements for farms with arable land above certain size – the need for crop diversification and maintenance of ecologically focused areas (EFAs). This is potentially the land use with the biggest change in the land management practices as long as the farm holdings are above the land size thresholds.

The fourth group of permanent crops covers only 435 ha and is considered as green-by-definition by the CAP Greening scheme, therefore has no land management requirements.

2.2.Farms and farming systems

The data about the number of farms and farming systems is rather limited at municipal (LAU 1) level. The Agricultural Census in 2010 is the only source of publicly available information; however, it contains no data about the farming systems. Furthermore, the categories of farm size do not match the threshold levels set in the CAP Greening Scheme (Table 2).

The initial estimations about the implementation of the CAP Greening scheme in the case study area of Western Stara Planina based on the Agriculture Census data (Table 2) are the following:

- 71% of the farms in the region will not implement the Greening scheme either because they have no land (5%) or because they are too small (< 1 ha, 66%) and thus not eligible for CAP support. This applies to 7% of the used agricultural area in 2010.
- 24% of the farms and 16% of the UAA are considered "green-by-definition" because their land is less than 10 ha.
- Greening requirements are likely to be implemented on 5% of the farms and 77% of the UAA, based on 2010 farm size estimations.

Table 2. Farms and utilised agricultural area per farm size

	Farms		**UAA**	
Farms	**number**	**% of all**	**ha**	**% of all**
without UAA	205	5	0	0
0 to 0.99 ha	2,473	66	917	7
1 to 9.99 ha	901	24	2,164	16
10 to 49.99 ha	140	4	10,445	77
over 50 ha	47	1		
Total	**3,766**	**100**	**13,526**	**100**

Source: Own calculation based on MAF, Agriculture Census 2010, 2012

[3] Even if some land owners actually own more than one plot of land, their cumulative areas are still smaller than 10 ha in most cases.

The active farms in 2010 had a combination of agriculture land uses (Table 3). Permanent grasslands were used on 72% of the farms, arable land on 66% and permanent crops on 45%. The average size per farm is very low, mostly because this data includes the 66% of farms up to 1 ha. Furthermore, the land use allocation considers all land used in farms, but excludes the use of common land. Thus, most farms have at least two land use types and some use larger areas of grasslands.

Table 3. Farmland use on farms in the region (Agriculture Census, 2012)

	Farms		Farmland - UAA		Average size
Land use	**number**	**% of all**	**ha**	**% of all**	**ha**
Arable land	2,338	66	3,968	29	1.7
Perment grasslands	2,579	72	9,175	68	3.6
Permanent crops	1,596	45	866	6	0.5
ALL farms (with UAA)	**3,561**	**-**	**13,526**	**100**	**3.8**

Source: Own calculation based on MAF, Agriculture Census 2010, 2012

The diversity of land use in Western Stara planina case study area is well represented by CORINE land cover data (Table 4). Pastures, natural grasslands and heterogeneous farming areas dominate in the agricultural land, which makes the entire region an important area of High Nature Value farmland.

Table 4. Agriculture land cover in Western Stara planina case study area

Land use types	**Share in all agriculture land (%)**
Arable land	20.0
Permanent crops	1.5
Pastures and natural grasslands	39.3
Heterogeneous agriculture areas	39.2
-- *Complex cultivation patterns*	*13.8*
-- *Land principally occupied by agriculture with significant area not cultivated*	*25.4*
Total	**100**

Source: CORINE Land Cover, 2012

2.3.Farming systems intensity

There is no officially published data about the intensity of land use and mineral or organic fertilizer use at LAU 1 municipal level in Bulgaria.

Livestock density in Western Stara Planina in 2010 is estimated at 0.10 LU/ha (Agriculture Census data). This is a very extensive use of pastures given that the use of common grasslands is not presented in this data. In 2017, livestock density increases to 0.28 LU/ha, which is still extensive use of the pastures in the area. The estimation considers all grazing animals,

including horses; and all permanent pastures eligible for CAP support, including common pastures.

3. Characteristics of the Green and Blue Infrastructure in Western Stara Planina

3.1. Green Infrastructure policy in Bulgaria

Bulgaria has no dedicated green infrastructure strategy or action plan. However, the objectives of the National Biodiversity Strategy 2020 are in line with the EU Green Infrastructure Strategy. Bulgaria aims to integrate its National Ecological Network into the EU and global ecological network and to launch trans-boundary protected areas, zones and corridors The National Plan for the Most Important Wetlands in Bulgaria 2013–2022 includes measures for spatial and functional re-connection of wetland habitats in line with the Green Infrastructure concept. The strategic part of the Bulgarian Rural Development Programme 2014-2020 also refers to contributing to the EU GI Strategy.

There is no information about mapping of GBI elements and features in the case study area aside from the mapping of landscape features under the CAP Greening commitment done by the Ministry of Agriculture.

3.2. Biodiversity designations and management requirements in Western Stara planina

Almost the entire territory of the case study area is covered by Natura 2000 sites indicating the high biodiversity value of the region. There are five sites for the protection of wild birds (SPAs) and four sites for the protection of natural habitats (SCIs).

The majority of agricultural land in the Natura 2000 sites in Western Stara planina is permanent pastures and grasslands. They are classified as high nature value farmlands and are mainly used for grazing or as hay-making meadows or (nowadays) are machine-mown, where terrain conditions allow. All permanent pastures in Natura 2000 sites in Bulgaria are identified as Environmentally Sensitive Grasslands, which means that they cannot be ploughed up or converted to other agricultural uses.

A certain part of the agricultural land in the Natura 2000 sites is covered by small-scale mosaic of arable lands and orchards. Orchards are mostly extensively used and even abandoned. Traditionally uncultivated field borders provide a habitat for certain bird and butterfly species and represent important ecological corridors.

The main agricultural land use restrictions introduced in the Natura 2000 sites for the protection of wild birds prohibit the removal of landscape elements and features such as field margins, individual trees and groups of trees as well as the use of pesticides and mineral fertilizers in pastures and meadows. The time of meadows mowing is a restriction only in some of the Natura 2000 sites.

3.3. Water designations and management requirements

- **River-basin management plans**

The case study area is located in the Danube river basin and covers the catchment areas of three rivers – Iskar, Ogosta and Nishava. The main measures related to agriculture in the Danube river-basin management plan are the implementation of the good agriculture and environmental conditions, good agricultural practices in the nitrate vulnerable zones, considerate use and storage of fertilizers and pesticides, construction of manure storage facilities and use of organic fertilizers.

- **Flood-risk maps**

The flood-risk areas in the Danube river basin and its catchments are analysed, mapped and priorities for future action are defined. There is one high-risk area in Western Stara planina case study area. It is located in Ogosta river catchment around the town of Berkovitsa. Given that the territory is urban, there are no priorities or actions for the agricultural land around it.

- **Nitrate vulnerable zones**

There are no nitrate vulnerable zones in Western Stara planina case study area. In general, the national action programme and CoGAP recommends buffer strips along water bodies.

3.4. Climate mitigation and/or adaptation measures

There is no information about district (NUTS 2) or municipal (LAU 1) climate-related strategies or action plans.

3.5.Green and Blue Infrastructure assessment in BIOGEA project

Western Stara planina case study area has a high presence of Green and Blue Infrastructure (GBI) elements and features[4]. The main connectivity GBI elements are grassy and, especially, woody strips, with some streams too. Semi-natural vegetation includes large amounts of scrubland and forests, as well as permanent pastures and grasslands. In-fields, small amounts of N-fixing crops followed by fallow are the main GBI features. Agroforestry and perennial crops (orchards) are also present.

3.5.1. Biodiversity assessment

The preliminary results of the modelling[5] of GBI-biodiversity relationships in the case study area provide the following highlights:

- Tree groups enhanced overall bird diversity, but affected negatively steppe, farmland and threatened birds, including marginally threatened farmland birds.
- The number of isolated trees were negatively related to steppe, farmland, threatened, and, marginally, threatened farmland birds, but benefitted plant species richness, both overall (main and secondary species together) and marginally species richness of secondary plant species.
- Grassland were negatively correlated with the diversity of threatened birds, including threatened farmland birds, but benefitted marginally species richness of plants (main and secondary species together).
- Agroforestry also benefitted plant richness, both overall (main and secondary species together) and secondary plant species individually, but was detrimental for farmland and steppe birds, including threatened farmland birds.
- Orchards affected negatively threatened birds, including threatened farmland birds, as well as plant species richness, both overall (main and secondary species together) and main plant species individually.
- Other (than cereal and N-fixing) herbaceous crops affected negatively plant richness, either overall, main or secondary plant species.
- Fallow land was positively correlated to overall bird diversity and, marginally, to the diversity of farmland birds.

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[4] 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

[5] 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

- Mean size of herbaceous crops benefitted overall bird diversity, but affected negatively threatened birds and, marginally, steppe and threatened farmland bird species, as well as species richness of main plant species.
- Richness of herbaceous crops, in contrast, marginally benefitted steppe bird species, but not overall bird diversity.
- Grassy strips benefitted overall bird diversity.
- Woody strips, in contrast, affected negatively overall bird diversity, but benefitted diversity of farmland, threatened and threatened farmland birds.

The results of the biodiversity-GBI modeling showed that the two biodiversity indicators (plants and birds) responded to GBI elements in somewhat opposite ways. Overall, woody vegetation (trees, scrub, agroforestry, orchards, and woody strips) were positively associated to plant and overall bird diversity but negatively to open-country steppe, farmland, and threatened birds, which tend to depend on extensively used arable land (they benefitted from fallow, and grassy strips and small field sizes. Maintenance of extensive agriculture (i.e., preventing abandonment) is thus needed for biodiversity conservation in the study area. Promoting woody strips, fallow land and grassland to favour more specialist and threatened farmland birds and preventing field size enlargement to favour plant richness will be the best policy options for biodiversity conservation in this area[6].

3.5.2. Assessment of stakeholders' and farmers' awareness on GBI

The BIOGEA project assessed 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 respondents 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"**

The interviewed stakeholders (N=8) and farmers (N=21) were generally aware about the GBI terminology (Figures 3 and 4). Stakeholders stated that they were "definitely aware" (n=6) and "aware to some extent" (n=2). Three interviewed farmers were definitely aware too (with mixed farming systems). Nine farmers were aware to some extent and one that was not sure. The interviewed farmers that were not aware were eight.

[6] 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

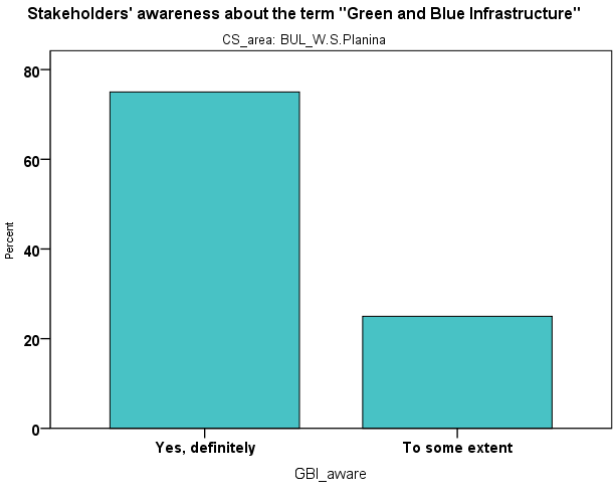


Figure 3. Stakeholders' awareness of GBI (N=8)

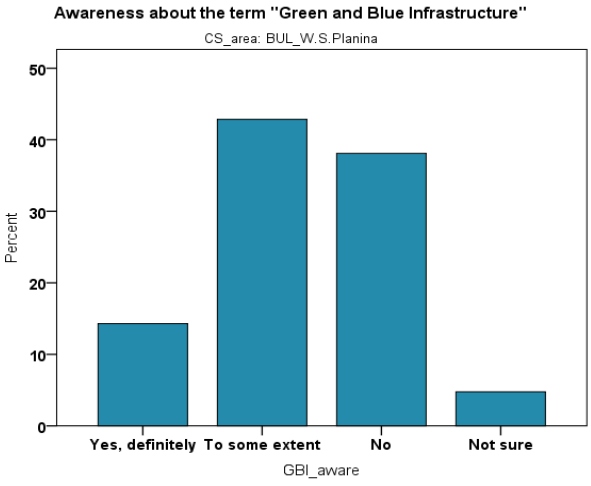


Figure 4. Farmers' awareness of GBI (N=21)

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

The interviewed stakeholders recognised between 12 and 19 (mean value of 15) GBI elements in the case study area as a whole. All of them indicated the presence of permanent grasslands and pastures, scrubland, individual trees and groups of trees, agroforestry/orchards, field margins, land laying fallow and areas with nitrogen fixing crops.

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

The interviewed farmers (N=21) identified between 5 and 17 (mean value 10) GBI elements and features on their farms. Most interviewed farmers (95%, n=20) have isolated trees on their farms. Over 70% of respondents (n=16) state the presence of permanent grasslands and pastures, land laying fallow and areas with nitrogen fixing crops as well as scrubland and field margins.

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

Farmers were asked to self-assess their knowledge about the appropriate management of GBI elements on their farms from environmental perspective. Stakeholders were asked to assess in general whether farmers in the case study area knew how to manage GBI elements from environmental perspective.

Farmers' perspectives. The interviewed farmers who were certain about the management of GBI elements and features from environmental perspective were 15. Four farmers responded they were aware to some extent and one stated that he was not aware. One did not answer the question.

The examples provided most often referred to maintaining landscape features and elements in good agricultural and environmental condition (GAEC). Farmers explained that trees should not be cut down. Some farmers responded, "There are instructions that are being checked and

controlled and we follow the instructions - not using plant protection products, fertilizers, etc.". Others provided very specific examples about the deadlines and related practices "For the permanent pastures: between 6 and 24 May the livestock is grazing on the grasslands. Between 24 May and 15 June the grazing is stopped. We do the first mowing immediately after 15 June and then we let the livestock grazing on the grasslands again. We rotate grazing and mowing, because with the grazing we also spread manure on the grasslands." "Grasslands in Natura 2000 should not be cut before 15 July. They should not be treated with heavy machinery and plant protection products should not be used." There was also one farmers who shared "All these features are on my farmland but I don`t delineate them (apply for payments). I don't take a risk and I don't deal with clerks."

Stakeholders' perspectives. In general, stakeholders' assessment of farmers' knowledge on GBI maintenance was positive – three said "definitely yes", five "to some extent" and one was not sure. However, stakeholders' assessed it from administrative perspective rather than environmental one:

- ✓ "They are well informed how to maintain them - it is written in the instructions that they receive", which is also how the controlling authorities take responsibility;
- ✓ "Small part of them knows how to maintain (*the landscape features*). Some of them think that if they haven't cleaned a terrace, they will be sanctioned by SFA (*paying agency*). That's why sometimes they clean (*vegetation*) even more than necessary. This is because they don't know the requirements that are all set in Ordinance #3".
- ✓ "Farmers have learned to maintain them in good agricultural and ecological condition. Municipal agricultural services and SFA organize information campaigns about direct payments and provide brochures and handbook".

There were also opinions that "farmers are not interested in GBI features". "Experts give them the advice" but "farmers maintain features when they receive direct payments".

4. Implementation of the CAP Greening scheme in Western Stara Planina

4.1. CAP Greening scheme in Bulgaria

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 Bulgaria 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 15 May and 15 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.

Initially Bulgaria offered 14 EFA options to farmers comprising land laying fallow; nitrogen fixing crops; catch crops; buffer strips; short rotation coppice; strips along forests; terraces and landscape features: field margins; hedges; isolated trees; trees in line and trees in groups; ponds and ditches. In 2017, five EFA options were removed from the list – buffer strips and terraces, isolated trees, ponds and ditches. Some of them (buffer strips, terraces, hedges and field boundaries, and standing trees) are protected by GAEC.

- **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, that include the grasslands within the Natura 2000 protected areas, and in certain cases they may also be outside Natura 2000 areas. Environmentally sensitive grasslands cannot be ploughed or converted.

The ratio of permanent pastures is monitored at national level. The Environmentally Sensitive Grasslands (ESG) in Bulgaria cover all grasslands within Natura 2000 areas designated in compliance with the Law on biodiversity. The identification of ESG is based on the permanent grasslands (PG) layer within the LPIS system. The area notified as ESG is 426,348 ha. There is also a High Nature Value layer in the LPIS system in Bulgaria. However, if a parcel of grassland falls within the HNV layer, but outside Natura 2000 area, currently it is not considered as ESG and can be ploughed with a written permission of the Minister of Agriculture.

4.2.CAP Greening scheme implementation in Western Stara Planina 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.

The average farm size in WSP is generally low and most of the agriculture land is permanent pastures. However, there are still farms with management practices influenced by the CAP Greening scheme. The interviews with farmers were intentionally focused on larger farms to examine those influences.

The total number of CAP Greening scheme beneficiaries in Western Stara Planina case study area was 546 in 2016[7].

- **Greening scheme: Permanent pastures**

Most of the respondents (n=18, 86%) implemented the permanent pasture element of the CAP Greening scheme. Three of them responded that all pastures they used were classified as environmentally sensitive grasslands (ESG) and three said theirs were not. Eleven farmers had only part of their pastures classified as ESG. One did not respond.

- **Greening scheme: Crop diversification**

Fourteen respondents (67%) implemented the crop diversification element. The number of crops grown on the farms was between three and eight (Table 5), with most respondents growing three or four crops. Fodder varieties of wheat, corn, barley and sunflower seemed to be the dominant crops on respondents' farms but luzerne was reported on most farms (n=10).

Table 7. Crops grown on respondents' farms (n=12)

Crops	Respondents														no. respondents
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	
luzerne	x	x		x	x			x	x	x	x		x	x	**10**
wheat		x		x	x	x	x	x		x	x	x			**9**
corn		x			x	x	x		x	x		x		x	**8**
barley	x	x		x	x	x	x		x					x	**8**
sunflower				x	x	x	x		x	x	x	x			**8**
oats			x		x			x		x		x	x		**6**
fallow land	x										x		x	x	**4**
peas			x	x	x								x		**4**
vetch			x										x		**2**
rye					x										**1**
hemp													x		**1**
total no. of crops	**3**	**4**	**3**	**5**	**8**	**4**	**4**	**3**	**4**	**5**	**4**	**4**	**6**	**4**	

Source: Farmers' interviews

[7] Data calculated from the online information system on CAP beneficiaries. https://seu.dfz.bg/seu/f?p=727:8110:::NO::: Accessed on 29.05.2018

Farmers' motivations for the crops' choice comprised a mixture of farm needs and realities. Half of them needed the fodder for their animals. Three referred to the profitability and/or income from these crops. One was considerate of the agro-climate conditions for growing crops. One referred to the workload "I do not need more employees for them". Only one mentioned the Greening "requirement to have three crops." The interviewed stakeholders shared similar observations about farmers' motivations (the need of fodder for animals, the climate and soil conditions, the mountainous terrain, the payments and income) and added "the traditional practices" in the region.

- **Greening scheme: Ecological focus areas**

The same number of farmers (n=14) that applied crop diversification implemented the EFA element. All of them had fallow land and ten had nitrogen-fixing crops. Four respondents each declared catch crops and groups of trees. The other EFA options chosen by farmers were trees in line (n=2), forest strips, coppice and field margins (one each).

The ecological focus areas are 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.

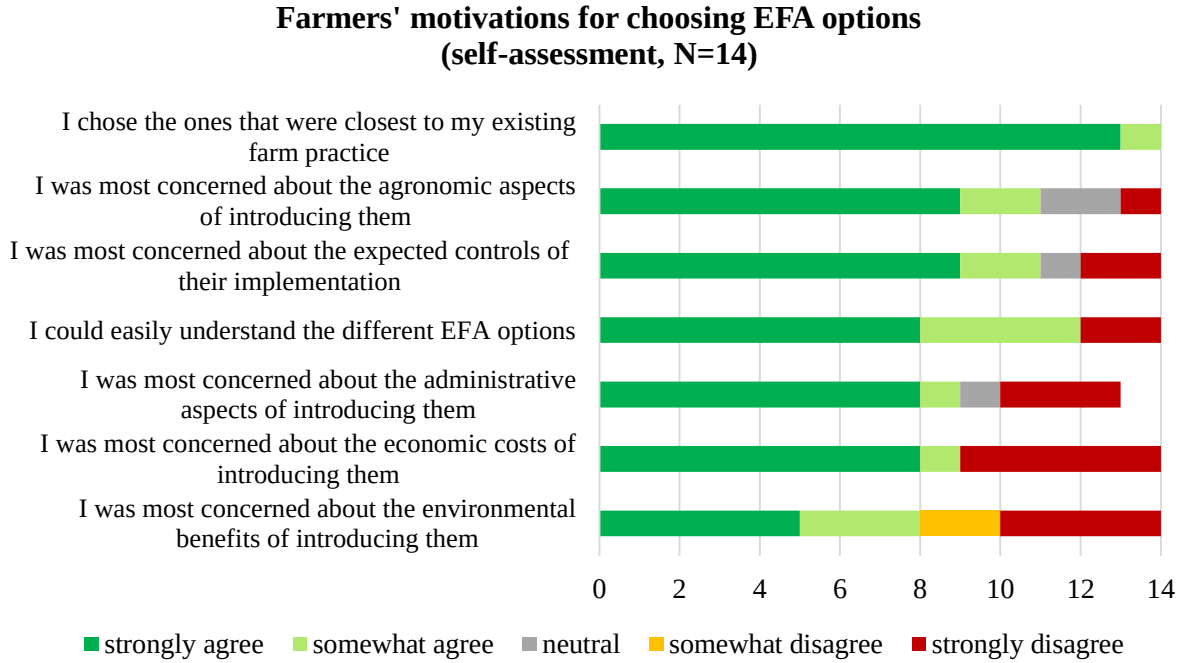


Figure 5. Farmers' self-assessment of motivations for choosing EFA options

All interviewed farmers agreed that they chose EFA options that were closest to their existing farming practices and needs. “I am cultivating the crops that I need for my livestock” was a common statement. The agronomic aspects were also of concern to farmers. Some said, “Fallow land is good only for 1 year” and “The fallow land is difficult to maintain, it is not economically profitable and I do not see the benefits of having EFA”. Others shared “After 3 years I am already used to these practices. The fallow land turned to be useful - the land rests when left fallow. I also choose for fallow land plots that cannot be used for something else.” The controls of EFA options were also a serious concern for farmers “I do not map the buffer strips because I am concerned by the control. Not sure if my GPS system and the one of the technical inspectorate will match the delineation”.

Environmental motivations were at the bottom of the list with the highest number of disagreeing farmers: “I easily understood the EFA options but still do not see the point of the scheme”.

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 is that stakeholders assess the EFA choice motivations of farmers in the case study area in general.

The results indicate that from stakeholders’ perspective farmers were most concerned about the economic costs which they interpreted as tightly linked to the controls and risk of sanctions and loss of payments: “Most common concern is the control by State Fund Agriculture (SFA)”; “They are worried about the checks and whether they will be sanctioned“. One stakeholder explained, “Sometimes it is easier to farmers not to apply for subsidies and not to have to fulfil the related requirements”. This is especially relevant for landscape features: “They do not claim landscape features, because they are afraid from the controls and the checks”. As far as the understanding of the different EFA option is concerned, stakeholders said “In the first year of EFA implementation farmers didn't understand it. Now they understand it clearly. They are most of all concerned about the eligibility criteria. The trend in the recent years is towards reduction of fallow land. Maybe also because the weight coefficient for nitrogen fixing crops and green cover crops was increased”.

Stakeholders also assessed environmental benefits as the weakest motivator for farmers.

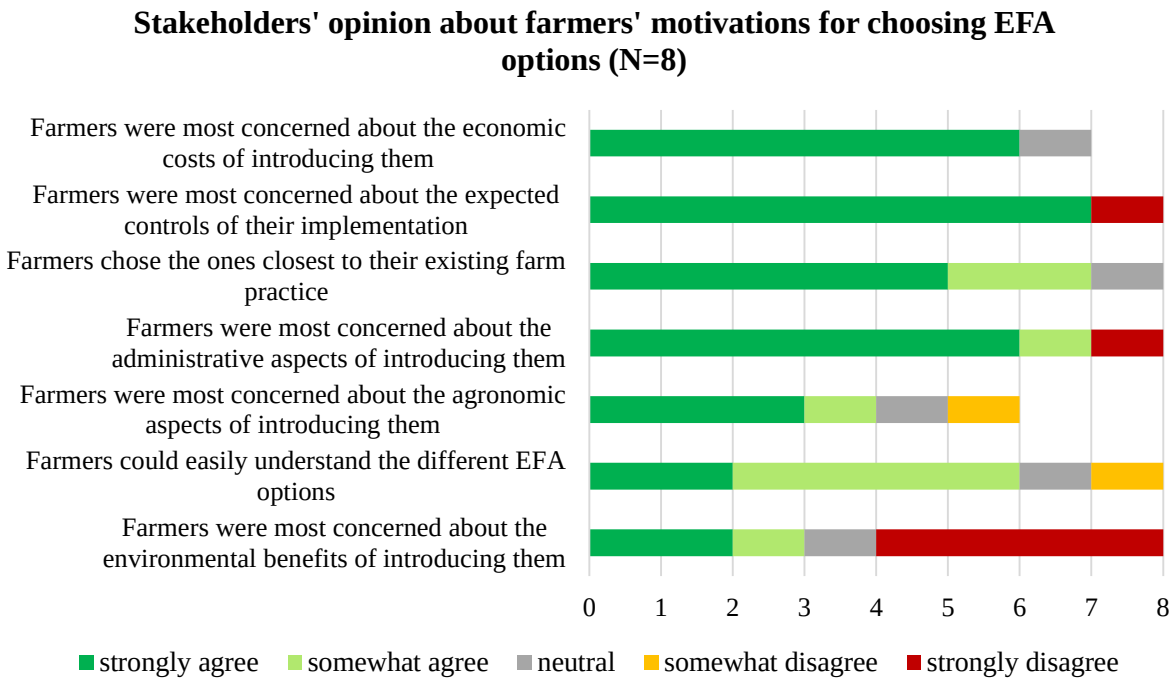


Figure 6. Stakeholders' assessment of farmers' motivations for choosing EFA options (N=8)

4.3.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 CAP Greening scheme implementation on farms**

Environmental perspective. Most respondents agreed with the statements related to environmental improvements on their farms (Figure 7). The biggest improvement they see is in soils quality: "the soil is better", "soil is improving when I use manure and green manure", and "soil quality is improving which is good for the next crop". They also see overall environmental improvement "the activities are good for the environment, when there is no use of mineral fertilizers". Farmers also observed an increase in the "visits from wild animals – wild boars, quails, jackals, pheasants" and "wild boars have increased because they like the barley". Unfortunately, they see it as a negative aspect too: "the mixture that I sow attracts deers, boars, jackals and even a wolf" and "The maize, however, attracts a lot of wild boars and this causes losses in the wheat as well".

At the same time, there were farmers who were less positive about environmental improvements: "There is no change" and about biodiversity "I do not know as I have not examined it to have an opinion." Fallow land, and especially cultivation after it, is a specific issue for some respondents "I don't understand the point of having fallow land. It is difficult

to cultivate after that. I wouldn't have even 1 square meter of fallow land if it wasn't a requirement."

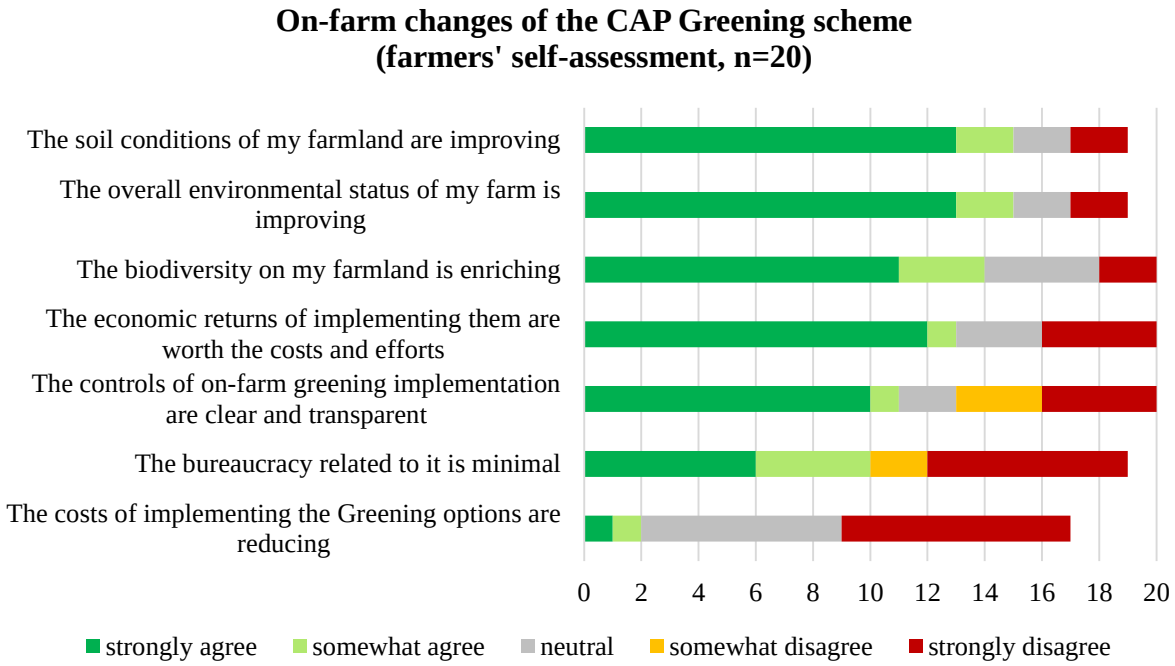


Figure 7. Farmers' assessment of on-farm changes resulting from CAP Greening scheme

Economic perspective. Overall, interviewed farmers agreed (n=13) that the economic returns from Greening were worth the costs and efforts. They referred both to satisfaction with the payments as well as some reduced costs from the limited use of mineral fertilizers. Some also considered the new markets available in the region: "In our case there is economic profit from lucerne. There is a high demand for it in Berkovitza."

At the same time, they mostly disagreed that the cost for Greening implementation were reducing. "The costs remain the same (throughout the years)" was a common statement. "The costs for the lucerne cultivation and maintenance remain the same because some reseeding is necessary. Around 10-15% of the lucerne area has to be reseeded each year." One respondent explained "It is on the edge. If you make even one mistake and they reduce your payments, it is very likely that your expenses will become higher than the revenue. The first year I had a reduced EFA payment due to an omission of one requirement I was not aware of."

Administrative implementation and controls. Respondents' opinions about the administrative burden were split. Half said "There is no additional administrative burden" and "The bureacracy is normal". The other half was less positive "It is just one tick in the form. However, the documentation in general is much" and even "Disgusted! The activities are connected with many documents". Regarding controls, which were among the biggest issues for farmers, some shared the experience that "In general the checks and controls depend on the personal attitude and understanding of the inspector. Some PA inspectors are friendly, they give advices if something is not done properly."

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

Environmental perspective. Overall, stakeholders' assessment of the environmental changes since Greening implementation were positive. They observed biodiversity improvements in "wild fauna", "the populations of species is increasing, e.g. vultures in Dolno Ozirovo" as well as "landscape maintenance". The opinions about soil improvements were more cautious. "The soil structure is probably improved although some tests need to be taken and analysed to be sure" and "There is limited diversification of crops. Only when there is crop rotation with different crop groups an improvement of the soil quality can be observed". Some take it that "the soil structure is improved especially when there are resting areas (fallow land)".

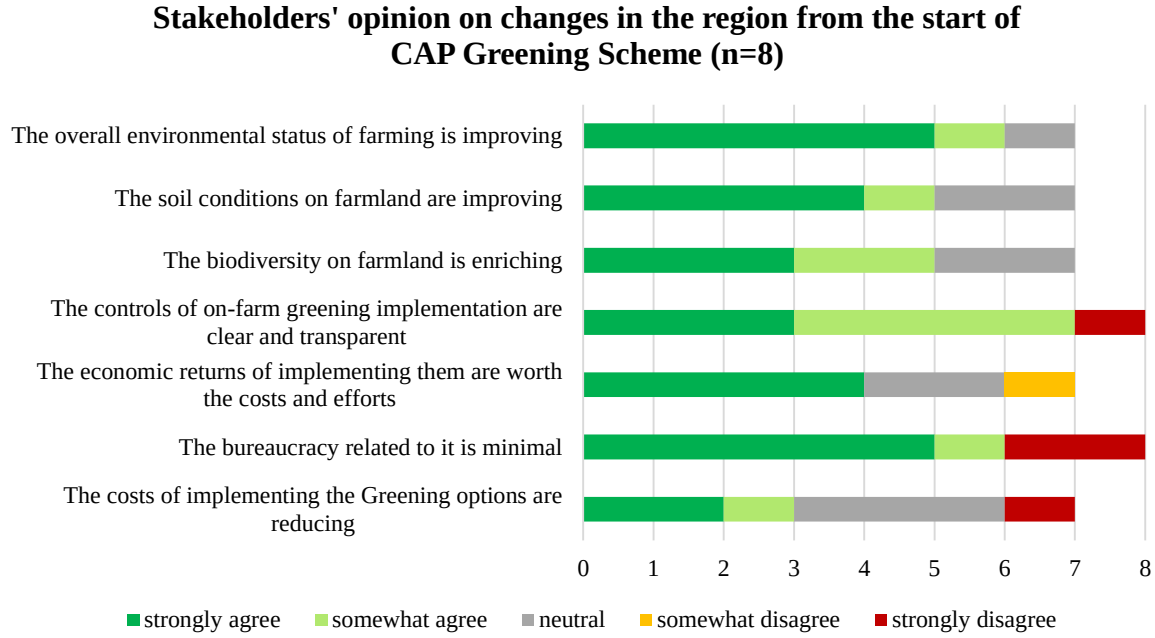


Figure 8. Stakeholders' assessment of CAP Greening scheme implementation in the region

Administrative implementation and controls. Stakeholders considered that "bureaucracy is acceptable", because "the greening claim is automatically ticked when you claim SAPS payments". Some also added "Our activities are transparent and clear (envisaging the on-the spot control)".

Economic perspective. Stakeholders believed that there was an "increase in farms' income" since "payments are helping the agricultural holdings", especially when they "implement a combination of measures – organic farming or Natura 2000 compensations". They saw the economic improvements from Greening also in the "increased soil fertility".

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

Farmers were asked if CAP Greening scheme implementation leads to long-term changes on their farms (Figure 9); stakeholders had to respond about all farms in the case study area (Figure 10).

Farmers' perspectives. The respondents that stated no change in their long-term practices were majority. Their main concern was fallow land due to the increased efforts for its cultivation in the follow-up years, thus "If the payments stop, I wouldn't have fallow land". Livestock farmers assessed Lucerne as a positive change, so some farmers planned to maintain it "I think that the lucerne is good for my livestock". Regarding permanent pastures, respondents explained that "There are mainly pastures in this region, which is why the Greening scheme has not made much impact" and "We are doing the same operations (hence no change in practices)".

Stakeholders' perspective. Stakeholders thought that any long-term changes would be specific for each farm "according to the crops grown and the present landscape features". Most long-term changes they expected were related to the administration of schemes: "Farmers learned to comply with the requirements and follow the rules". At the same time, one stakeholder added "Having clear written rules (more understandable) and clear control of their practical implementation is a condition for better results and higher traceability".

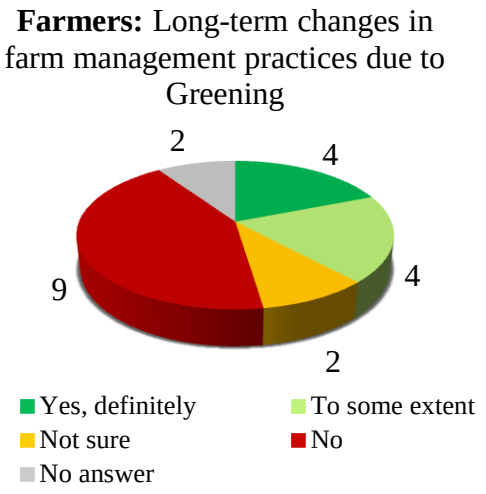


Figure 9. Farmers assessment of long-term changes on their farms due to Greening (N=21)

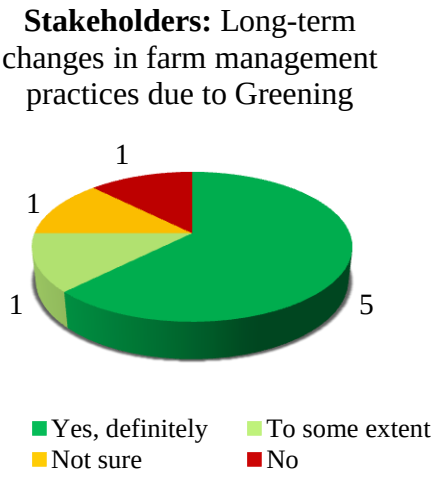


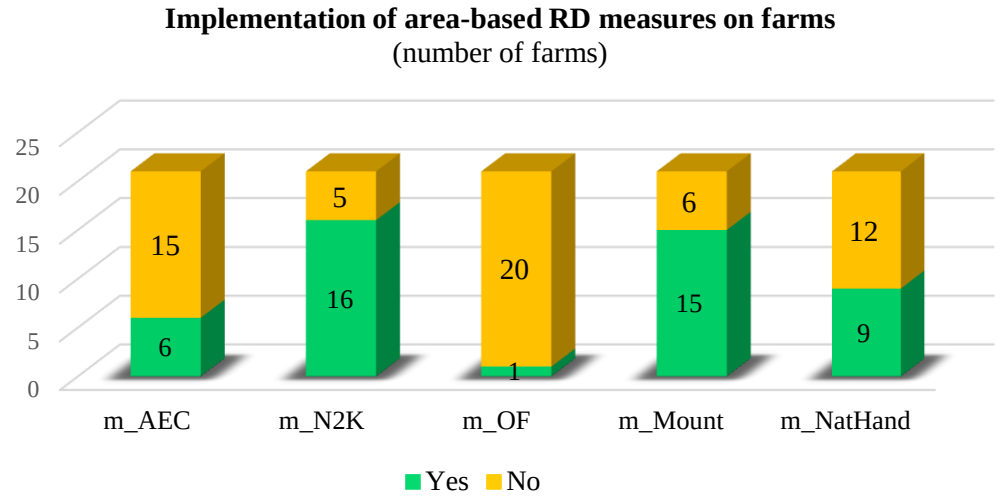
Figure 10. Stakeholders assessment of long-term changes on farms in the CS area due to Greening (N=8)

4.4. 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 scheme and the other measures.

- **Rural development measures**

Most respondents (n=16) participated in the Natura 2000 and in the mountainous areas (n=15) compensatory payment measures. Nine farmers received payments for areas with natural handicaps and six participated in the agri-environmental-climate measure. One was in the organic farming measure (Figure 11).



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 11. Respondents participation in environment-related area-based rural development measures (N=21)

The similarities that farmers observed between the Greening scheme and the rural development environmental measures referred to the similar aims such as protecting grasslands in Natura 2000 areas. However, they noted that the management requirements in the Natura 2000 measure were higher. For example, under the Natura 2000 measure grasslands could be mown after 15 July and from inside of the field to outside, while Greening did not specify such requirements.

Administratively, there were some similar requirements – one unified application and cross compliance. The differences from farmers' perspective related to different duration of commitments between agri-environment (5-years) and the rest of the measures (annual); as well as the different payment levels (Natura 2000 payment is lower).

- **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 (Table 8).

Farmers and stakeholders share similar ranking at the top – organic farming and Natura 2000 measure. There was only one organic farmer in the respondent's group; however, farmers said "The control of organic production is the strictest, while SAPS payments don't have any link to environment protection", but also "Not all farmers can practice organic farming". Most farmers said they were able to assess only the measures they implemented, hence the high position of SAPS in the ranking.

The comments from stakeholders added a local perspective: "There are only a few organic farmers in the municipality and therefore its contribution for the environmental objectives is limited". "In general, the agri-environment and Natura 2000 measures can be both at first place". However, Natura 2000 measure was preferred due to the specific management requirements for each zone. The SAPS scheme was least appropriate from stakeholders' perspective due to the lack of environmental objectives in it.

Table 8. Respondents' ranking of the CAP schemes or measures that are most appropriate to meet environmental objectives on farmland.

Farmers' ranking		Stakeholders' ranking
1. Organic farming measure		1. Organic farming measure
2. Natura 2000 measure		2. Natura 2000 measure
3. Single Area-based Payment Scheme		3. Agri-environment measure
4. Greening scheme		4. Greening scheme
5. Agri-environment measure		5. Cross Compliance
6. Cross Compliance		6. Single Area-based Payment Scheme

4.5. Training and advice on CAP Greening scheme

CAP Greening scheme introduced both new requirements about farmland management and new approachs to claiming Pillar I subsidies. We asked farmers whether they received training on Greening or EFA options, 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. Only four farmers stated they have received training or advice on Greening scheme. Farmers considered as training dedicated events such as the ones organised by the regional agriculture directorate or the agriculture advisory office where they were informed about the options and requirements of the schemes.

The main sources of information about CAP schemes and measures as well as on environmental aspects of farming were the municipal agriculture offices and Internet. Other farmers were also an important source of information among the respondents, even before the agriculture advisory service.

The preferred forms of advice was direct – either farm visits or telephone contacts. Farmers' preference for advisors is "to be competent and to come to the farm as well as to have positive attitude towards farmers". By "competent advisors" respondents understood "to have practical experience in agriculture. Experts without practical experience cannot give competent advices and to write the different support schemes and programmes". Therefore, farmers said, "I trust only our municial agricultural office. We cannot understand the language that the consultants are using".

Stakeholders' perspectives. Six stakeholders responded that their organisations provided training and/or advice about Greening and EFA – local agriculture institutions and farm advisors.

The training and consultations provided by the interviewed stakeholders' institutions included in-office and telephone consultation about the different schemes and measures; information days and farm visits, as well as joint meetings with representatives of the paying agency and the advisory service.

4.6.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 CAP Greening scheme in 2014. None of the interviewed farmers or stakeholders was directly involved in the process.

Further to the question of direct involvement, farmers were asked if they were aware of other organisations that have been involved in consultation or decision-making. Most farmers were not aware which local institutions or organisations have been involved. Some farmers (n=4) and some stakeholders assumed that municipal agriculture authorities have been involved.

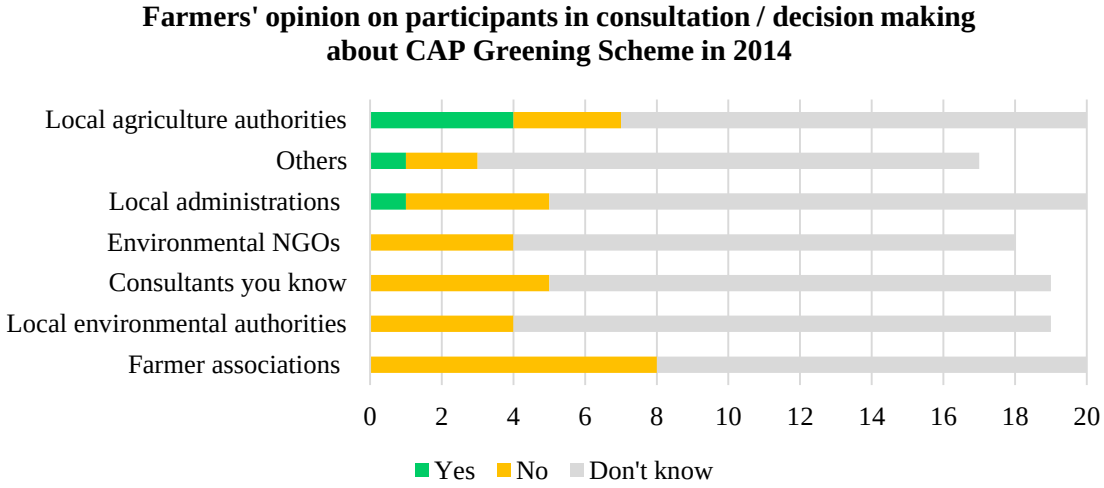


Figure 12. Farmers' awareness about local participation in the CAP Greening decision-making in 2014

5. Conclusions from BIOGEA findings in Western Stara Planina case study area

Western Stara planina is the extensive land use case study area under the BIOGEA project in Bulgaria. It is a mountainous rural area, with a stable trend of decreasing population and continuously reducing work force. Permanent pastures dominate the utilised agricultural area, followed by mixed land uses of small mosaic cropping and orchards plots; and then by arable land. The farming systems characterising the case study area are extensive grazing livestock breeding (cattle, sheep and goats, and some horses). The lowlands host arable farming systems – mostly cereals for fodder as well as some perennial crops (strawberries). There is still a very high number of small farms (less than 10 ha) that manage a small share of the land, and a small number of larger farms that manage most of the land. Furthermore, there are still large areas of abandoned agricultural land – former arable land, orchards as well as pastures and meadows.

GBI features and elements in Western Stara planina case study area

- Western Stara planina case study area has a high presence of Green and Blue Infrastructure (GBI) elements and features. The main GBI elements are grassy and, especially, woody strips, large amounts of scrubland and forests, and permanent pastures and grasslands. Small amounts of N-fixing crops followed by fallow are the main in-field GBI features. Agroforestry and perennial crops (orchards) are also present.
- Results of the biodiversity-GBI modeling showed that woody vegetation (trees, scrub, agroforestry, orchards, and woody strips) were positively associated to plant and overall bird diversity but negatively to open-country steppe, farmland, and threatened birds. Maintenance of extensive agriculture (i.e., preventing abandonment) is thus needed for biodiversity conservation in the study area. Promoting woody strips, fallow land and grassland to favor more specialist and threatened farmland birds and preventing field size enlargement to favor plant richness will be the best policy options for biodiversity conservation in this area.

Farmers and stakeholders' awareness about GBI

- Both interviewed farmers and stakeholders indicated awareness about GBI as terminology. Overall, stakeholders seemed more certain about their GBI knowledge than interviewed farmers did.
- When the specific GBI elements and features were named, stakeholders recognised between 12 and 19 (mean value of 15) GBI in the case study area, supporting the findings of the BIOGEA biodiversity assessment of high presence of GBI elements and features.

- Interviewed farmers identified between 5 and 17 (mean value of 10) GBI features on their farms. Most interviewed farmers have individual trees, permanent grasslands, land lying fallow and areas with nitrogen-fixing crops. Many indicated also the presence of scrubland and field margins.
- Farmers' knowledge about GBI management from environmental perspective was based on the GAEC and Natura 2000 measure management requirements.
- Stakeholders linked farmers' awareness about GBI environmental management to GAEC as well as to permanent grasslands' eligibility requirements. However, they commented them mostly from administrative perspective (instructions, ordinances, information events, etc.).

CAP Greening scheme in Western Stara planina case study area

- The number of CAP Greening beneficiaries in Western Stara planina CS area was 546 in 2016. This was half of the farms above 1 ha that were eligible for CAP support in 2010, indicating dynamic restructuring of the farms in the region (and in Bulgaria).
- The project team calculations (based on LPIS 2017 data) showed that 21% were most likely "green-by-definition" due to mixed land use and likely farm size of less than 10 ha.

Permanent pastures

- The share of permanent pastures in this CS area is very high – 64%. Almost all of them are situated in Natura 2000 sites and are defined as environmentally sensitive grasslands. They are also classified as High Nature Value grasslands.
- Farmers raised no particular issues about permanent pastures management under the CAP Greening scheme. Their biggest issue with permanent pastures is the eligibility for CAP support due to the overgrowth with scrubs and trees.

Crop diversification

- The typical arable crop scheme among the interviewed farmers in the case study area is wheat, corn, barley and sunflower; and the majority is grown for fodder.
- Farmers' motivated their crops choice with farm needs (fodder for animals); income and profitability of crops; regional agro-climatic conditions as well as the limited availability of workforce (hence the mechanised production preference).
- Stakeholders added also the traditional practices in the region - the typical crops grown in the region due to the livestock farming needs.

EFA element

- The EFA Greening elements introduced were mostly fallow land and nitrogen-fixing crops (lucerne, peas and vetch). Some respondents declared also catch crops, groups of trees and other landscape features.
- Most interviewed farmers were concerned about securing the fodder for their livestock; thus, they opted for the EFA options closest to their existing practices and producing animal feed.
- Fallow land seemed to be the easy first option for many farmers. However, many of them were concerned about the increased costs and efforts of land preparation in the years following fallow land. This made them question the overall environmental benefit of fallow land, especially considering the Bulgarian requirement for ploughing it at least once per year. On the other hand, some farmers observed a benefit from fallow land -the use of plots that could not be managed efficiently.
- Stakeholders shared that there was a reduction in the declaration of fallow land in the region, especially after the weight coefficient for nitrogen-fixing crops was increased.
- Farmers were also very concerned about the controls and sanctions of the 5% EFA requirement, given their negative experience with sanctions due to land ineligibility and overlaps with neighbour's fields. Stakeholders confirmed this concern and explained that farmers preferred to withhold the declaration of landscape features than to suffer the sanctions and loss of income from CAP payments.
- Both interviewed farmers and stakeholders assessed that the environmental benefits were farmers' least concern in the choice of EFA options.

Implementation of the CAP Greening scheme

- Most farmers and stakeholders agreed with the statement about environmental improvements because of Greening implementation. They referred to improved soil conditions as well as increased "visits from wild animals" – wild boars, deer, jackals, wolves, etc.
- Some respondents observed no changes or lacked information to assess the situation.
- The interviewed farmers mostly agreed that the Greening economic returns were worth the costs and efforts considering the payment level, the reduced costs of mineral fertilizers as well as the new markets for lucerne.
- At the same time, respondents disagreed that the costs are reducing. They referred to annual management costs of both fallow land (ploughing) or lucerne.
- Most farmers and stakeholders also agreed that the controls were clearer three years after the start of implementation. However, the overall bureaucracy continued to be a

problem for most of them. Some indicated it was no different from the main CAP application.

- Regarding long-term changes because of Greening, interviewed farmers were less positive. They also indicated that given the dominance of permanent pastures in the region, CAP Greening scheme did not have any significant impact.
- Stakeholders' perspectives on long-term changes related to farmers learning to comply with "green" requirements for the CAP support as well as the need to have clear, well-written and understandable rules for practical implementation.

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. Nevertheless, few farmers referred to use these options – most said they had no training or advice on environmental matters or Greening implementation.
- At the same time, most interviewed farmers rely on the municipal agriculture offices both for agricultural and environmental aspects of farming. Their second option for information is Internet (various institutional and farming websites) as well as other farmers.
- Farmers prefer direct forms of advice – farm visits or face-to-face discussions.
- Farmers demand their advisors to be competent both in the practical, operational aspects of farming, to have up-to-date and relevant information about CAP support measures and schemes, as well as to be experienced in technical application matters such as land delineation in the LPIS system.

Participation in CAP Greening scheme decision making

- The participation in the CAP Greening decision making by the interviewed farmers and stakeholders was very limited. None of the interviewed farmers or stakeholders was directly involved in the process.
- Most interviewed farmers were not aware which local or regional institutions or organisations did participate. Some interviewed farmers and stakeholders believed that municipal agriculture offices were involved.