



Council of the
European Union

138564/EU XXV. GP
Eingelangt am 29/03/17

Brussels, 29 March 2017
(OR. en)

7766/17
ADD 1

AGRI 171
AGRIORG 35
AGRILEG 69
AGRIFIN 34
AGRISTR 31

COVER NOTE

From:	Secretary-General of the European Commission, signed by Mr Jordi AYET PUIGARNAU, Director
date of receipt:	29 March 2017
To:	Mr Jeppe TRANHOLM-MIKKELSEN, Secretary-General of the Council of the European Union
No. Cion doc.:	SWD(2017) 121 final - PART 1/3
Subject:	COMMISSION STAFF WORKING DOCUMENT Accompanying the document REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL on the implementation of the ecological focus area obligation under the direct payment scheme

Delegations will find attached document SWD(2017) 121 final - PART 1/3.

Encl.: SWD(2017) 121 final - PART 1/3



EUROPEAN
COMMISSION

Brussels, 29.3.2017
SWD(2017) 121 final

PART 1/3

COMMISSION STAFF WORKING DOCUMENT

Accompanying the document

**REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND
THE COUNCIL**

**on the implementation of the ecological focus area obligation under the direct payment
scheme**

{COM(2017) 152 final}

CONTENTS

<i>LIST OF ACRONYMS</i>	3
<i>LIST OF FIGURES</i>	4
<i>LIST OF TABLES</i>	4
1. INTRODUCTION	5
1.1. Commission EFA report of March 2017: mandate, purpose and scope.....	5
1.2. Past and future initiatives relating to greening.....	6
2. KEY TRENDS IN ENVIRONMENTAL INDICATORS	7
3. EFA OBLIGATION — OBJECTIVES, KEY PROVISIONS AND RELATIONSHIP WITH OTHER CAP INSTRUMENTS	10
3.1. Key elements and objectives of greening, including EFA	10
3.2. Legal basis.....	10
3.3. Obligations for farmers	11
3.4. Calculation of the EFA area for the purpose of meeting the 5 % requirement	12
3.5. Changes to farmers' obligations resulting from the 2016 review	12
3.6. Exemptions from the EFA obligation	13
3.7. Relationships between EFA and the rest of the CAP	13
3.8. Additional approaches.....	14
3.9. Alternatives to EFA obligation	15
3.10. IACS and greening: control requirements and the penalties system.....	15
3.11. Notifications by Member States	18
4. METHODOLOGY, DATA SOURCES AND LIMITATIONS	19
4.1. Approach to assessment	19
4.2. Analysis of Member State decisions and implementation data.....	20
4.3. Data on the uptake of greening and EFA obligation.....	20
4.4. Context data.....	21
4.5. Classification of NUTS 3 regions based on EFA implementation data.....	22
4.6. Simulations of potential impact of EFA.....	24
4.6.1. EFA calculator - introduction.....	24
4.6.2. Structure and foundation of the EFA calculator.....	24
4.6.3. Impact scores.....	26
4.6.4. The aggregation process.....	28
4.6.5. Use of the EFA calculator with NUTS 3 regions.....	28
4.6.6. Warnings and limits in the use of the calculator	30
4.7. Study requested by the Commission	31
4.8. Other relevant scientific literature.....	31

LIST OF ACRONYMS

AEC	Agri-environment-climate
BS	Buffer strips
CAP	Common agricultural policy
CF	Conversion factor
CC	Catch crops and green cover
SWD	Commission staff working document
EFA	Ecological focus area(s)
EUNIS	European nature information system
FSS	Eurostat Farm Structure Survey
GAEC	Good agricultural and environmental conditions (of land)
HNV	High nature value
IACS	Integrated administration and control system
JRC	Joint Research Centre
LF	Landscape features
LLF	Land lying fallow
LPIS	Land Parcel Identification System
MS	Member State
NFC	Nitrogen-fixing crops
PPP	Plant protection products
RDP	Rural Development Programme
SMR	Statutory management requirement
WF	Weighting factor

LIST OF FIGURES

Figure 1 Visual representation of the nine categories	23
Figure 2 Broad impact matrix between EFA types and biodiversity EUNIS groups	26
Figure 3 Broad impact matrix between EFA types and ecosystem services.....	26
Figure 4 Impact matrix for fallow land on amphibians.....	27

LIST OF TABLES

Table 1 Productive and non-productive EFA types	11
Table 2 Exemptions from the EFA rules.....	13
Table 3 Links between EFA and cross-compliance mechanism.....	14
Table 4 Summary of EFA types and attached requirements	17
Table 5 Member States' notifications on greening choices relating to EFA	18
Table 6 Availability of notifications related to EFA submitted by Member States	20
Table 7 Classification criteria of NUTS 3 regions	23

1. INTRODUCTION

Implementation of the reformed common agricultural policy (CAP) began in 2015 and covers the period up to 2020. The reformed CAP has a new policy instrument under its overarching objective of ensuring sustainable management of natural resources and climate action. This instrument, the **green direct payment** incorporated under the CAP's first pillar, introduces specific measures that contribute to addressing concerns over biodiversity loss, soil and water quality and climate change.

This Commission staff working document (SWD) provides an analytical background to the **progress achieved in implementing** one of the greening obligations presented in the Commission Report, namely the **ecological focus area (EFA) obligation**.

The first chapter of this document explains the mandate, purpose and scope of the initiative, and how it links with past and future initiatives concerning greening. Chapter 2 describes contextual data on the main environmental trends linked to agricultural areas and influenced by agriculture. Chapter 3 explains the purpose of the EFA obligation and details its components. Chapter 4 explains the methodology and outlines the main limitations of the analysis. Chapter 5 analyses national quantitative data on the uptake of EFA. Chapter 6 provides first insights into the likely environmental impacts of the EFA instrument. Chapter 7 lists the bibliographic references.

1.1. Commission EFA report of March 2017: mandate, purpose and scope

The Commission's obligation to present by 31 March 2017 an evaluation report on the implementation of the EFA obligation, accompanied where appropriate by a legislative proposal to increase the EFA percentage from 5 % to 7 %, is laid down in Article 46(1) of Regulation (EU) No 1307/2013 on direct payments ('the Basic Regulation').¹

Based on this mandate, the Commission Report examines the progress on implementing the EFA obligation. The report:

- looks into the EFA implementation options selected by Member States;
- examines the uptake of EFA elements by farmers;
- explores the potential environmental and climate-related impacts of the EFA obligation in the light of available scientific information on the effectiveness of features and elements that qualify as fulfilling an EFA obligation.

Where relevant, the report also uses information from a dedicated public consultation on greening that the Commission ran in 2015 and 2016.²

The report does not constitute an evaluation under the Commission's standards as set out in the Commission's Better Regulation Guidelines of 19 May 2015.³ Furthermore, it examines only the potential environmental effects of the EFA obligation as is it as yet too early to

¹ Regulation (EU) No 1307/2013 of the European Parliament and of the Council of 17 December 2013 establishing rules for direct payments to farmers under support schemes within the framework of the common agricultural policy and repealing Council Regulation (EC) No 637/2008 and Council Regulation (EC) No 73/2009, OJ L 347, 20.12.2013, p. 608.

² https://ec.europa.eu/agriculture/consultations/greening/2015_en.

³ See COM(2015) 215 final and SWD(2015) 111 final.

collect and study evidence of its actual impacts. The evaluation of the real impacts will require also qualitative field data in the future analysis.

1.2. Past and future initiatives relating to greening

Greening review after one year and ensuing legislative amendments

The report builds upon the results of the work done in 2016 as part of the **review of greening after one year of application**.

When the CAP reform was adopted, the Commission committed itself to: reviewing the EFA obligation in the light of the experience gained after the first year of its application; looking into the administrative burden arising from the new rules; the impact on the level playing field for farmers coming from differences in implementation by Member States; and the impact on production potential⁴.

The review, conducted as part of **simplifying the CAP** and of the **Commission's 2016 REFIT programme**⁵, took a broader view on greening. The review was finalised in 2016 with the publication of the Commission staff working document of 22 June 2016⁶ assessing how the system had been applied in the first year, identifying certain weaknesses that prevent full exploitation of its potential, and considering possible ways forward to remedy them.

Following up on the review, the Commission put forward a number of changes to certain parts of the greening legislation⁷, focusing mostly on EFAs⁸. The changes are meant for application as of the 2018 claim year, but Member States may implement them already in the 2017 claim year. As of March 2017⁹ these changes have not yet entered into force.

Evaluation of all greening measures

A more in-depth assessment of EFAs' environmental performance and of the whole greening obligation will be included in the evaluation scheduled for completion by the end of 2017 or early 2018.¹⁰ The evaluation will be conducted on the basis of the five evaluation criteria as

⁴ Commission Declaration of 2 April 2014; http://ec.europa.eu/agriculture/newsroom/161_en.htm.

⁵ Regulatory Fitness and Performance programme, see Annex II to Commission Work Programme for 2016, COM(2015) 610 final.

⁶ SWD(2016) 218 final.

⁷ Commission Delegated Regulation (EU) No 639/2014 of 11 March 2014 supplementing Regulation (EU) No 1307/2013 of the European Parliament and of the Council establishing rules for direct payments to farmers under support schemes within the framework of the common agricultural policy and amending Annex X to that Regulation, OJ L 181, 20.6.2014, p. 1-47.

⁸ Commission Delegated Regulation (EU) .../... of 15.2.2017 amending Delegated Regulation (EU) No 639/2014 as regards the control measures relating to the cultivation of hemp, certain provisions on the greening payment, the payment for young farmers in control of a legal person, the calculation of the per unit amount in the framework of voluntary coupled support, the fractions of payment entitlements and certain notification requirements relating to the single area payment scheme and the voluntary coupled support, and amending Annex X to Regulation (EU) No 1307/2013 of the European Parliament and of the Council, C(2017)735

⁹ European Parliament and Council scrutiny on the legislative amendments ongoing.

¹⁰ See the 2017 Management Plan — Agriculture and Rural Development; https://ec.europa.eu/info/publications/management-plan-2017-agriculture-and-rural-development_en and the roadmap: http://ec.europa.eu/smart-regulation/roadmaps/docs/2017_agri_002_evaluation_greening_en.pdf.

defined in the Commission Better Regulation Guidelines: **effectiveness, efficiency, coherence, relevance and EU added value**. The evaluation should also provide timely results for the performance report due in 2018 on the CAP monitoring and evaluation¹¹.

2. KEY TRENDS IN ENVIRONMENTAL INDICATORS

Many valuable habitats and the biodiversity they encourage are developed with and rely on farming systems. However, the efforts involved in safeguarding this biodiversity are not recognised by markets and therefore not reflected in the prices farmers receive for their produce. **While the preservation of this biodiversity depends on appropriate management practices, these practices — driven by competitive pressures — have been subject to change**, with increasing specialisation and intensification of production in some areas and land abandonment in others. These have resulted in pressures on biodiversity, detrimental effects on soil, water and climate, **and put the agricultural sector's long-term production potential at risk**.

To monitor the impact of CAP policy between 2014 and 2020, 45 socioeconomic, sectoral and environmental indicators were selected¹², tracking among others the developments described above¹³. The trends most relevant for environmental focus areas are described below, supplemented by information from other relevant sources. However, their evolution depends on the combined effect of various policy instruments, both within CAP and beyond. Furthermore, in many cases, EU aggregations mask regional and national differences. The information below should be read in this context.

- The most commonly used barometer of the general state of biodiversity in agricultural areas is the **farmland bird indicator (FBI)**. The indicator keeps track of the populations of selected bird species characteristic of farmland and is used as a barometer of the biodiversity change in agricultural land. Bird populations are considered to be a good indicator of the broad state of wildlife and the countryside because they occupy a wide range of habitats and tend to be near to or at the top of the food chain. Since 1990, farmland bird populations in the EU have decreased by nearly 30 %. While populations of common bird species have started stabilising since 2010, farmland birds have continued declining, albeit at lower rate. The trend shows that bird species that depend on the farmland habitat as created by human activity are increasingly threatened by new agricultural practices. Among them are changes in land use (crop rotation patterns, disappearance of uncultivated verges, disappearance of hedgerows) and the increasing land take (asphalted areas).

¹¹ Under Article 110(5) of Regulation (EU) No 1306/2013 of the European Parliament and of the Council of 17 December 2013 on the financing, management and monitoring of the common agricultural policy and repealing Council Regulations (EEC) No 352/78, (EC) No 165/94, (EC) No 2799/98, (EC) No 814/2000, (EC) No 1290/2005 and (EC) No 485/2008, OJ L 347, 20.12.2013, p. 549.

¹² Commission Implementing Regulation (EU) No 834/2014 of 22 July 2014 laying down rules for the application of the common monitoring and evaluation framework of the common agricultural policy OJ L 230, 1.8.2014, p. 1,

Commission Implementing Regulation (EU) No 808/2014 of 17 July 2014 laying down rules for the application of Regulation (EU) No 1305/2013 of the European Parliament and of the Council on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) OJ L 227, 31.7.2014, p. 18.

¹³ https://ec.europa.eu/agriculture/sites/agriculture/files/cap-indicators/context/2015/indicator-table_en.pdf.

A detailed description of definitions, methodology and data sources is provided in the Technical Handbook on the Monitoring and Evaluation Framework of the Common Agricultural Policy 2014-2020.

- The distribution and share in agricultural areas of land uses and farming systems considered supportive for farmland biodiversity is reflected in **the high nature value (HNV) farming indicator**. While there is no common methodology for identifying HNV in different territories, such territories are most commonly characterised by low-intensity management practices, a significant presence of semi-natural vegetation, and/or diversity of land cover, including features such as ponds, hedges and woodland. The share of HNV in agricultural area varies considerably among Member States, ranging from more than 60 % in some to less than 20 % in others. Typical HNV farmland areas are extensively grazed uplands, alpine meadows and pasture, steppe areas in eastern and southern Europe, and *dehesas* and *montados* in Spain and Portugal. Certain more intensively farmed areas in lowland western Europe can also host concentrations of species of particular conservation interest¹⁴. However, the HNV indicator does not reflect the current situation of biodiversity in the field.
- The information reported under the Habitats¹⁵ and Birds¹⁶ Directives shows no measurable improvement in the **status** of species and habitats associated with agriculture between the reporting periods 2001-2006 and 2007-2012: for **habitats** (Annex 1 to the Habitats Directive), 4 % of the assessments showed an improvement between the two periods while 39 % of the assessments showed deterioration. For **species** the corresponding figures were 4 % and 20 % respectively.¹⁷ The habitats linked to agriculture (grassland and cropland) have the lowest share of favourable assessments among terrestrial habitats¹⁸.
- The main impacts of agriculture on water are linked to losses of nutrients such as nitrates and phosphates from agricultural soils into freshwaters. Applied in excess, both nitrates and phosphates play a significant role in triggering eutrophication processes. Potential risks in this regard are measured by the **gross nutrient balance indicators**. According to latest data, which covers the period from 2008 to 2011, for the EU-28 the average balance between the nitrogen added to an agricultural system and that removed from it was 47 kg per ha. However, this was almost 16% lower than in the period 2000-2004. In addition, the figure was much lower in the EU-13 than in EU-15. Nevertheless, on average, the EU still has a significant surplus of nitrogen¹⁹.
- However, actual risks depend on several factors such as intensity of agricultural activities at local level, climate conditions, soil characteristics and certain management practices. **Nitrate concentrations in groundwater and surface waters** are among the criteria for identifying waters polluted or at risk of pollution²⁰. As of 2012, most Member States showed a clear prevalence of surface waters with concentrations of

¹⁴ Paracchini et al., High Nature Value Farmland in Europe, EEA and JRC, 2008: http://agrienv.jrc.it/publications/pdfs/HNV_Final_Report.pdf.

¹⁵ Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, OJ L 206, 22.7.1992, p. 7.

¹⁶ Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds, OJ L 20, 26.1.2010, p. 7–25

¹⁷ EU assessment of progress in implementing the EU Biodiversity Strategy to 2020, SWD(2015) 187 final

¹⁸ State of nature in the EU report 2015: <http://www.eea.europa.eu/publications/state-of-nature-in-the-eu>.

¹⁹ Annual Indicator Report Series (AIRS) — Environmental indicator report 2016:

<http://www.eea.europa.eu/airs/2016/natural-capital/agricultural-land-nitrogen-balance>.

²⁰ According to Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources, OJ L 375, 31.12.1991, p. 1.

nitrate below the drinking water threshold of 50 mg nitrate per litre²¹. However, many still had water bodies with concentrations over the level at which eutrophication and other negative effects on aquatic ecosystems appear. As for ground waters, the share of water bodies exceeding the drinking water threshold was generally higher than for surface water in most of the countries, with around 85 % of monitoring sites in the EU showing concentration levels below 50 mg nitrate per litre.

- **Soil erosion by water** is one of the most widespread forms of soil degradation in Europe, with the average rate of loss amounting to 2.4 t/ha/year. In 2012 around 6.6 % of the EU total agricultural area was estimated to be suffering from moderate to severe erosion (>11 t/ha/year). Soil degradation by water erosion is particularly significant in some countries of southern Europe and in mountainous countries. Cultivated land (arable and permanent cropland) is estimated to be more affected than permanent grasslands and pasture. Soil erosion trends in EU showed a moderate decrease between 2000 and 2012²² mainly due to the application of environmentally sustainable agricultural practices such as reduced tillage, plant residues, cover crops, stone walls, contouring and grass margins. It should, however, be noticed that the soil erosion indicator is based on a model which defines only the potential soil erodability without taking into account the actual soil erosion which can only be calibrated through in field observations.

²¹ Threshold set by Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption, OJ L 330, 5.12.1998, p. 32.

²² When calculating the indicator, the support practices were estimated for the first time at European level, taking into consideration the good agricultural and environmental conditions (GAEC).

3. EFA OBLIGATION — OBJECTIVES, KEY PROVISIONS AND RELATIONSHIP WITH OTHER CAP INSTRUMENTS

3.1. Key elements and objectives of greening, including EFA

The aim of greening is to enhance the environmental performance of the CAP²³. The instrument makes a part of direct payments received by farmers conditional on their observance of three ‘greening’ practices beneficial for the environment and the climate. These **practices** are:

- dedicating 5 % of arable area as an ecological focus area (EFA);
- crop diversification;
- maintenance of permanent grassland.

The overall objective comprises **objectives of**:

- carbon sequestration linked to the maintenance of permanent grassland²⁴;
- improvement of soil quality associated with crop diversification²⁵;
- safeguarding and improving biodiversity on farms associated with the establishment of EFAs.²⁶

There are two types of **expected effects of EFAs**: (i) those affecting biodiversity **directly**; (ii) those affecting biodiversity **indirectly**, where the improvements are achieved by reducing the inputs on agricultural areas. The legislation underlying greening also refers to certain desired or unwanted effects on other environmental media (i.e. on water) that should be avoided.

The greening obligations aim to make farmers apply certain basic practices to ensure environmental/climate benefits, either by changing their practices (to achieve better environmental/climate outcomes) or by maintaining already applied practices (to maintain environmental/climate benefits).

3.2. Legal basis

The basic rules of greening are set out in Regulation (EU) No 1307/2013 on direct payments (‘the Basic Regulation’). The Regulation:

- **establishes the three standard greening obligations**, including the establishment of an EFA and the elements comprising it (Article 46);
- lays down **objectives** linked to the obligations;
- defines **basic concepts and terms**.

Article 43(12) and (13) of the Basic Regulation empowers the Commission to specify **certain technical parameters and implementing arrangements** via delegated and implementing acts. This has been done in Commission Delegated Regulation (EU) No 639/2014 (the

²³ Recital 37 of Regulation (EU) No 1307/2013.

²⁴ Idem, Recital 42.

²⁵ Idem, Recital 41.

²⁶ Idem, Recital 44.

‘Delegated Regulation’) and Commission Implementing Regulation (EU) No 641/2014 (the ‘Implementing Regulation’)²⁷.

The **administration, financing, management and control requirements** are laid down in Regulation (EU) No 1306/2013, while Delegated Regulation (EU) No 640/2014²⁸ and Implementing Regulation (EU) No 809/2014²⁹ specify the rules on the integrated administration and control system (IACS).

In addition, Commission services have drawn up **technical guidance** documents for Member State authorities, e.g. on the EFA layer and on the Land Parcel Identification System (LPIS). These guidance documents explain the relevant obligations and put them into context.

3.3. Obligations for farmers

Article 46(1) of the Basic Regulation requires farmers with **arable land** exceeding 15 ha to ensure that at least **5 % of such areas is an ecological focus area**. In Article 46(2) this Regulation defines what may be counted as an EFA area (**the ‘EFA types’**).

Some of the EFAs (landscape features and strips of eligible hectares along forest edges) are further categorised in Article 45 of the Delegated Regulation. Various management, control and size-related requirements are also established for each EFA type (e.g. no production, limitation of agro-chemical inputs, maximum and/or minimum dimensions).

One of the main categorisations of EFAs is into areas on which production is possible and areas or features where this is not possible or which by nature exclude production (See Table 1).

Table 1 Productive and non-productive EFA types

Productive EFAs	Non-productive EFAs
Hectares of agro-forestry Strips along forest edges with production Short rotation coppice Catch crops/green cover Nitrogen-fixing crops	Land lying fallow Terraces Landscape features (hedges/wooded strips, isolated trees, trees in line, trees in group/field copses, field margins, ponds, ditches, traditional stone walls, other landscape features undercross-compliance) Buffer strips Strips along forest edges without production

On the basis of the common EFA list, **Member States draw up a list of EFA types** from which their farmers can choose. Member States may also change or add certain requirements for some EFA types. Under Article 45(3), (4) and (5) of the Delegated Regulation, terraces, landscape features and buffer strips which Member States protect under cross-compliance

²⁷ Commission Implementing Regulation (EU) No 641/2014 of 16 June 2014 laying down rules for the application of Regulation (EU) No 1307/2013 of the European Parliament and of the Council establishing rules for direct payments to farmers under support schemes within the framework of the common agricultural policy OJ L 181, 20.6.2014, p. 74.

²⁸ Commission Delegated Regulation (EU) No 640/2014 of 11 March 2014 supplementing Regulation (EU) No 1306/2013 of the European Parliament and of the Council with regard to the integrated administration and control system and conditions for refusal or withdrawal of payments and administrative penalties applicable to direct payments, rural development support and cross compliance, OJ L 181, 20.6.2014, p. 48.

²⁹ Commission Implementing Regulation (EU) No 809/2014 of 17 July 2014 laying down rules for the application of Regulation (EU) No 1306/2013 of the European Parliament and of the Council with regard to the integrated administration and control system, rural development measures and cross compliance, OJ L 227, 31.7.2014, p. 69.

rules can also be selected. Except in a few cases, the legislation does not specify the criteria for these national choices. Table 4 at the end of the chapter summarises EFA types and attached management requirements.

3.4. Calculation of the EFA area for the purpose of meeting the 5 % requirement

To calculate the EFA, the Basic Regulation established a system according to which each EFA type is assigned specific conversion and weighting factors. The values of these were subsequently established in Annex II to the Delegated Regulation (which amended Annex X to the Basic Regulation):

- **Conversion factors** simplify the measurement of some EFA types such as trees and ponds. Their use is optional for Member States.
- Differentiation of **weighting factors** reflects the fact that individual EFA types have different ‘characteristics’ and consequently a different impact on/importance for biodiversity in the light of EFA’s objective ‘*to safeguard and improve biodiversity on farms*’ (Recital 44 of the Basic Regulation). Accordingly, lower weighting factors (below 1) are assigned to elements that are productive compared with elements that are not productive and whose function, in principle, is only environmental (max. 2) and whose existence is therefore not warranted from a farmer’s perspective. Weighting factors below 1 are mandatory.

3.5. Changes to farmers’ obligations resulting from the 2016 review

Major changes pursued as a follow-up to the 2016 review of greening include: (i) a grouping of some EFA categories defined in the Delegated Regulation; and (ii) simplification and streamlining of dimension requirements. For the latter in particular, EFA elements that exceed the set dimensions or which are adjacent to a first EFA will no longer be excluded from being counted as EFAs. In addition, the changes include clarifying various requirements and concepts such as what is understood by ‘*no production*’ and how this restriction relates to rules under other CAP instruments and the extent of ‘*adjacency*’. Some changes also take better account of agronomic realities and seasonal weather conditions, by replacing deadlines with retention periods or changing the composition of certain crops required under an EFA.

The changes aim at:

- reducing the uncertainty farmers encounter in applying different EFA types;
- decreasing the complexity of distinguishing EFA types;
- allowing farmers to count as EFAs environmentally valuable features that have so far been excluded.

In addition, in order to increase the biodiversity benefits of EFAs, plant protection products are banned on (potentially) productive EFAs.

3.6. Exemptions from the EFA obligation

Several categories of farmers are exempt from all greening rules. In addition, there are a number of exemptions specifically from the EFA obligation. These apply particularly to farmers with a large proportion of grassland but also to farmers in predominantly afforested areas in certain Member States. The exemptions are summarised in Table 2.

Table 2 Exemptions from the EFA rules

Legal basis (the Basic Regulation)	Who	Scope	Rationale/category
Art 46(1)	Farmers having less than 15 ha of arable land	EFA	Proportionality (cost/benefit)
Art 61(3)	Farmers participating in the small farmers scheme (SFS)	All greening obligations	Simplification
Art 43(11)	Farmers complying with organic farming rules	All greening obligations	Farmers considered 'green by definition' because their practices are considered to yield at least the same environmental benefit or cases where application of greening rules would run contrary to its objectives e.g. lead to land abandonment
Art 43(10)	Farmers whose holdings are fully or partly located in areas covered by the Birds ³⁰ and Habitats Directives ³¹ or the Water Framework Directive ³²	Where the greening practices in the holding concerned are not compatible with the objectives of these Directives	
Art 46(4)	Farmers managing a predominant share of their farm as grassland, fallow land or crops under water	EFA	
Art 46(7)	Farmers in areas with natural constraints in countries with a predominant forest area	EFA	

3.7. Relationships between EFA and the rest of the CAP

The greening component of direct payments goes beyond the cross-compliance requirements in place since 2005. The cross-compliance mechanism³³ links CAP payments to farmers' observance of a set of **statutory management requirements** (SMRs) based on EU environment legislation in areas such as biodiversity and water³⁴ and several **standards for the good agricultural and environmental condition of land** (GAEC), which are defined by Member States:

- Member States may allow their farmers to count as EFA types the following features which require establishing or protecting under the cross-compliance rules: buffer strips along water courses (SMR 1, GAEC 1), terraces (GAEC 7), landscape features (SMR 2, SMR 3, GAEC 7).

³⁰ Directive 2009/147/EC of the European Parliament and of the Council

³¹ Council Directive 92/43/EEC

³² Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy, OJ L 327, 22.12.2000, p. 1–73

³³ Article 93 of Regulation (EU) No 1306/2013; rules on cross-compliance (SMRs, GAECs) are listed in Annex II to that Regulation.

³⁴ Besides environmental legislation, SMRs also cover EU legislative standards in the field of food safety, animal and plant health and animal welfare.

- In implementation of SMR 1, certain Member States require farmers to establish catch crops to take up residual nitrogen and so as to avoid bare soil and diffuse pollution in groundwater. Member States may also allow their farmers to qualify these areas with catch crops/green cover as EFA.

Table 3 Links between EFA and cross-compliance mechanism

EFA	Issues, requirements and standards under cross-compliance mechanism		
Buffer strips	Water	SMR 1	Nitrates Directive ³⁵ (Articles 4 and 5)
		GAEC 1	Establishment of buffer strips along water courses
Landscape features	Biodiversity	SMR 2	Birds Directive ³⁶ , Article 3(1), Article 3(2)(b), Article 4(1), (2) and (4)
		SMR 3	Habitats Directive ³⁷ , Article 6(1) and (2)
Landscape features and terraces	Landscape, minimum level of maintenance	GAEC 7	Retention of landscape features, including, where appropriate, hedges, ponds, ditches, trees in line, trees in group or isolated, field margins and terraces, and including a ban on cutting hedges and trees during the bird breeding and rearing season and, as an option, measures for avoiding invasive plant species

Source: DG AGRI, based on Annex II to Regulation (EU) No 1306/2013

For some of the areas or features mentioned above, farmers have to observe **additional requirements** to qualify these areas or features as an EFA, motivated by the biodiversity objective of the EFA obligation. For example, they are not allowed to have production on buffer strips or they must sow a mixture of species when sowing catch crops.

Together with cross-compliance, greening represents part of the ‘**baseline**’ or ‘**reference level**’ for voluntary agri-environment-climate (AEC) measures financed under Rural Development Programmes (RDPs). To avoid the risk of double funding (between AEC payments and green direct payments), financial support for such voluntary measures cannot compensate practices equal or similar to greening requirements. Instead, payments for these AEC measures are calculated on the basis of income foregone and costs incurred for practices going beyond the ‘baseline’. It is the responsibility of Member States to ensure that there is no duplication of funding.

3.8. Additional approaches

Based on Article 46(5) and (6) of the Basic Regulation, Member States may decide to implement the EFA requirement **regionally or collectively** in order to concentrate EFA areas within a particular territory. Under this approach, farmers are required (‘*regional implementation*’, Article 46(5), or allowed (‘*collective implementation*’, Article 46(6)) to organise themselves in such a way that they attain half of their EFA percentage requirements through adjacent EFAs, when these are located on the land of only some of the farmers

³⁵ Council Directive 91/676/EEC

³⁶ Directive 2009/147/EC of the European Parliament and of the Council

³⁷ Council Directive 92/43/EEC

involved, as this is considered more beneficial for the environment. The Delegated Regulation specifies rules and criteria to be met in this respect (Articles 46 and 47).

3.9. Alternatives to EFA obligation

According to Article 43(3) of the Basic Regulation, Member States may allow farmers to meet one or more greening requirements through **equivalent** (alternative) practices. The concept was introduced to accommodate the diversity of agricultural systems and the different environmental situations across Europe. The equivalent practices must be carried out either under AEC schemes within Member State RDPs, or in accordance with national or regional certification schemes. They must also yield an equivalent or higher level of benefit for the climate and the environment compared to one or more of the greening requirements. An exhaustive list of practices equivalent to 'standard' EFAs is provided in Annex IX to the Basic Regulation, together with certain management requirements. This covers:

- ecological set-aside;
- creation of 'buffer zones';
- management of uncultivated buffer strips and field margins;
- borders, in-field strips and patches;
- management of specified landscape features;
- keeping arable peaty or wet soils under grass (no use of fertilisers and no use of plant protection products);
- production on arable land with no use of fertiliser and/or plant protection products, and not irrigated, not sown with the same crop 2 years in a row;
- conversion of arable land into permanent grassland.

According to Article 43(8) of the Basic Regulation, it is for the Commission to decide whether a practice notified by a Member State can be recognised as being covered by Annex IX. Article 10 of the Implementing Regulation establishes the procedure for assessing these notifications and the applicable deadlines.

3.10. IACS and greening: control requirements and the penalties system

Like other direct payment schemes, the green direct payment is managed through the **integrated administration and control system (IACS)**. A common set of IACS rules applies to all direct payments. These rules are designed to ensure that EU taxpayers' money is correctly spent. However, a number of specific requirements apply to the green direct payment.

Article 70(2) of Regulation (EU) No 1306/2013 requires Member States to ensure by claim year 2018 at the latest that the LPIS contains the '**EFA layer**', a reference layer that includes EFAs. Information from the EFA layer is then used: (i) to help beneficiaries correctly declare their EFAs (the administration gives information on EFAs in the pre-established form that is provided to beneficiaries); and (ii) for cross-checking the EFAs declared by the farmer against the information in the EFA layer.

Farmers who fail to comply with the greening rules do not receive the full greening payment. Delegated Regulation (EU) No 640/2014 specifies the applicable rules on reductions and penalties. Reductions reflect the number of hectares identified as non-compliant with the greening obligations; as of 2017, administrative penalties apply as well, as provided for in the third subparagraph of Article 77(6) of Regulation (EU) No 1306/2013.

In line with the proportionality principle, the amount of the penalty depends on: (i) the severity and scope of non-compliance; (ii) whether it has a lasting impact; and (iii) whether it recurs. Details of reductions and administrative penalties are laid down in Articles 24 to 29 of Delegated Regulation (EU) No 640/2014.

In order to identify areas that are not compliant with the rules, Member States have to carry out **inspections** in line with the principles and rules set out in the IACS legislation. Article 31 of Regulation (EU) No 809/2014 is of particular importance for **on-the-spot-checks** on greening. It requires, as a rule, on-the-spot checks for:

- 5% of all beneficiaries required to observe greening (supplemented by 5% of all beneficiaries who are required to have EFAs if the Member State concerned does not yet have an EFA layer in place);
- 3% of beneficiaries who are exempted from complying with the greening obligations.

Several other provisions in that Regulation are also relevant for greening. One such provision is Article 26(4), which stipulates that additional visits may be required for certain EFA types, where it is possible to check certain eligibility criteria only during a specific time period.

Table 4 Summary of EFA types and attached requirements

EFA type	Cross-compliance	Dimensions Art. 45 (non-cross-compliance)		Key requirements/ management conditions set in Art. 45	Obligations / option for Member State to specify or change management conditions	CF (m ² /tree to m ²)	WF	Changes following the 2016 review
		Minimum limit	Maximum limit					
Land lying fallow				No agricultural production		n.a.	1	Ban on the use of PPPs 6 month min. retention period specified 'No production' specified, sowing of mixtures of flower seeds allowed
Terraces		MS shall set min. height				2	1	
	Hedges/wooded strips		10 m (width)	Features adjacent to arable land also eligible		5	2	Under one category with trees in line — see below
	Isolated trees	4 m (diameter); MS may include valuable trees < 4 m diameter		Features adjacent to arable land also eligible		20	1.5	Rule on minimum diameter removed Features adjacent to the adjacent EFAs also eligible
	Trees in line	4 m (diameter); MS may include valuable trees < 4 m diameter	5 m (space between crowns)	Features adjacent to arable land also eligible		5	2	One category with hedges / wooded strips. Area calculated to a maximum width of 10 m Rules on min. diameter and maximum space between crowns removed Features adjacent to the adjacent EFAs also eligible
	Group of trees/field copses		0.3h a	Features adjacent to arable land also eligible		n.a.	1.5	One category including field copses, trees, bushes or stones Area calculated to a maximum 0.3 ha Features adjacent to the adjacent EFAs also eligible
	Field margins	1 m	20 m; MS may decide on a lower max. limit	No agricultural production Features adjacent to arable land also eligible		6	1.5	Under one category with buffer strips — see below
	Ponds	MS may set up min. area	MS may allow inclusion of riparian vegetation of max 10 m in pond area	Concrete/plastic reservoirs excluded Features adjacent to arable land also eligible	MS may establish criteria to ensure ponds' natural value	n.a.	1.5	Area calculated to a maximum 0.3 ha Riparian vegetation always included in the calculation of the area Features adjacent to the adjacent EFAs also eligible
	Ditches		6 m	Concrete channels excluded Features adjacent to arable land also eligible		3	2	Features adjacent to the adjacent EFAs also eligible
	Traditional stone walls	MS may decide min. height and width	MS may decide min. height and width	Features adjacent to arable land also eligible		1	1	Features adjacent to the adjacent EFAs also eligible
	Other landscape features under cross-compliance			Features adjacent to arable land also eligible		n.a.	1	Features adjacent to the adjacent EFAs also eligible
Buffer strips	GAEC 1 SMR 1 & 10	MS to decide min. width provided not < 1 m	Max 10 m strip of riparian vegetation (included in buffer strip)	No agricultural production Features adjacent to arable land also eligible	MS may allow cutting and grazing provided buffer strips are distinguishable	6	1.5	Under one category with field margins — see below 'No production' specified, sowing of mixtures of flower seeds allowed Area calculated to a maximum width of 20 m MS to establish min. width not lower than 1 m Features adjacent to the adjacent EFAs also eligible
Hectares of agro-forestry						n.a.	1	
Strips along forest edges without production		MS to decide min. width provided not < 1 m	10 m	No agricultural production	MS may allow cutting and grazing provided strips are distinguishable	6	1.5	'No production' specified, sowing of mixtures of flower seeds allowed Area calculated to a maximum width of 20 m
Strips along forest edges with production		MS to decide min. width provided not < 1 m	10 m			6	0.3	Ban on the use of PPPs Area calculated to a maximum width of 10 m
Short rotation coppice				No use of mineral fertiliser (MF) and/or plant protection products (PPPs)	MS shall establish list of species most suitable from ecological perspective (excluding clearly non-indigenous) MS shall establish requirements on MF and PPP	n.a.	0.3	
Afforested areas						n.a.	1	
Catch crops/green cover	SMR 1			Sown at latest 1 October Only mixture of crops or under sowing grass Areas under winter crops excluded	MS to establish start & end date of sowing MS to establish list of crops MS may establish additional conditions, esp. production methods	n.a.	0.3	Deadline for sowing of catch crops/green cover replaced by min. retention period of 8 weeks to be set by MS Under sowing by leguminous made possible Ban on the use of PPP; for undersowing applicable from harvesting of main crop for at least 8 weeks or until sowing of next main crop
Nitrogen-fixing crops (NFC)				Crops contributing to biodiversity objectives Mixtures with crops other than NFC not possible	MS shall establish a list of crops (biodiversity contribution) MS shall establish rules on where NFC grown (risk of nitrate leaching) MS may establish additional conditions, esp. production methods	n.a.	0.7	Ban on the use of PPP Mixtures with crops other than NFC possible provided NFC remain predominant Obligation for MS to set rules on location of NFC, replaced by specification that the risk of leaching be taken into account within possible additional conditions

3.11. Notifications by Member States

The legislation specifies the schedule for Member States to notify the Commission of their implementation choices and information on the uptake of greening. This is summarised in Table 5.

Table 5 Member States' notifications on greening choices relating to EFA

Greening obligation	Type	Deadline	Legal reference	Content
Equivalence (incl. EFA)	Decision on implementation	1 August 2014 1 July following years	Basic Regulation Article 43(8) Implementing Regulation Article 10	Use of equivalent practices (optional)
EFA	Decision on implementation	1 August 2014 (annual review possible)	Basic Regulation Article 46(8)	Activation of EFA types
			Delegated Regulation Article 65(2)	Activation of conversion and weighting factors
			Delegated Regulation Article 65(3)	Regional and collective implementation
			Delegated Regulation Article 65(4)	Forest exemption
All	Monitoring output indicators	15 December each year	Delegated Regulation Article 65(1)(c) ³⁸	Implementation data for all greening obligations and exemptions

³⁸ The notification on implementation data under Article 65(1)(c) of the Delegated Regulation is also referred to in Regulation (EU) No 834/2014, where these indicators are part of the common monitoring and evaluation framework and in that context are qualified as output indicators in Section 3 of the Annex to the Regulation.

4. METHODOLOGY, DATA SOURCES AND LIMITATIONS

4.1. Approach to assessment

The analysis covered by this document is mainly based on implementation information (information concerning Member State decisions and farmers' uptake of EFA), some statistical context information and a literature review. This analysis is based on both qualitative and quantitative evidence and covers two years of implementation of greening, namely 2015 and 2016.

Implementation information is dealt with in the report based on:

- the notifications by Member States of their national choices on EFA elements and related requirements;
- the implementation data on the uptake by farmers of each greening measure compared against the statistical information on agricultural holdings in the EU (e.g. the Farm Structure Survey conducted by Eurostat).

Information for 2015, the first year of implementation, was gathered and published for the first time in the SWD of 22 June 2016. This report provides updates using the latest 2015 figures and also the available data for 2016, explained more in detail in the next chapters.

The quality of the Commission's assessment relies on the quality and timeliness of the Member States' reports. While preparing this report, the Commission was in regular informal contact with the Member States' authorities to ensure that reported data are as consistent as possible. There are, nevertheless, examples where reporting contains gaps or could contain contradictions.

Analysis of the potential environmental impact of the EFA obligation in the scientific literature is still at an early stage. After two years of implementation just a few studies have been produced on the subject. This report contains first observations on the potential environmental impact based on:

- the analysis made by Commission's Joint Research Centre (JRC) using a tool called the '*EFA calculator*' (explained in detail in Chapter 4.6);
- information from other scientific and academic sources on the effectiveness of the different elements of EFAs, detailed in Chapter 4.8.

The limitations of the analysis, which is still preliminary, are highlighted in each of the following chapters.

Where relevant, the assessment is supplemented by:

- other studies (see Chapter 4.7);
- input from stakeholders, including:
 - in the expert group and civil dialogue group formats;
 - from the stakeholder consultation on greening that the Commission conducted from mid-December 2015 until mid-February 2016.

4.2. Analysis of Member State decisions and implementation data

This report is based on data notified by Member States for the years indicated in Table 6. Decisions on approaches to implementation apply in the claim year following the year of notification. For example, notification on an EFA sent by 1 August 2014 was applicable for claim year 2015.

Table 6 Availability of notifications related to EFA submitted by Member States

Content	Year of notification	Year of implementation
Equivalence (including EFA)	2014	2015
	2015	2016
	2016	2017
EFA (Activation of EFA types — conversion and weighting factors — Regional and collective implementation — Forest exemption)	2014	2015
	2015	2016
	2016	2017
Implementation data for greening obligations and exemptions		2015
		2016

To ensure comparability and consistency of the analysis, this report is primarily based on data for claim year 2015, for which the Commission has received most complete information. Where data already available for the claim year 2016 point to differences in Member States' decisions and implementation data, these are also taken into account.

4.3. Data on the uptake of greening and EFA obligation

Member States have to provide the Commission with data on the uptake of greening each year by 15 December (see Table 5).

This data should be interpreted bearing in mind that greening is an obligatory scheme for all farms applying for direct payments in the period 2014-2020. Farms that have to meet greening obligations are therefore a subset of the farms under the direct payments scheme, the only difference between the two groups being farms exempted from greening (see Chapter 3.6).

This document builds upon the data provided by Member States for the following:

- **main indicators** on the number of farmers and hectares subject to at least one greening obligation³⁹, reflecting the overall coverage of greening;
- a selection of **specific indicators** on farms subject to⁴⁰ and exempted from the EFA obligation.⁴¹

The information was broken down geographically at NUTS 3 level (see below).

Based on the structure set out in the legislation⁴², the data, in excel format, was extracted by Member States' authorities from their respective IACS, which stores all direct payments and rural development applications.

³⁹ Article 65(1)(c)(i) of the Delegated Regulation.

⁴⁰ Idem, Article 65(1)(c)(vii).

⁴¹ Idem, Article 65(1)(c)(ii).

⁴² See footnotes 36 to 38.

- The **number of farmers** means the number of beneficiaries of direct payments, including both exempted farms and those subject to greening obligations. In practical terms, the number of beneficiaries of direct payments (and greening) can be considered as equivalent to the number of holdings (farms) available in the Eurostat Farm Structure Survey.
- The **number of hectares**, depending on the indicator in question, is calculated as the most relevant of the following:
 - total agricultural area (farms with at least one greening obligation, those under the small farmers' scheme and organic farms);
 - arable land; or
 - the EFA area.
- Member States should use the **areas farmers declared** in their applications, **or the areas established following administrative and on-the-spot checks**, where these figures are available at the time when the data are extracted from the database.

The data used in this document are based on the figures available at the end of January 2017, which encompasses:

- all Member States except France for 2015;
- 19 Member States for 2016⁴³.

Data for some Member States still require certain verification, especially for 2016. The figures for 2015 sent by Member States were verified and comments were sent to the countries where the data were found to be not consistent. Further updates on 2015 figures were received from six countries after the SWD on the review of greening after one year was completed⁴⁴. Possible caveats are indicated under each section of analysis.

4.4. Context data

To calculate the relative proportion of farms subject to greening requirements in Chapter 5 **on the state of play of implementation data**, information is needed on the contexts in which greening is applied. The main types of context data that are useful when calculating greening indicators are:

- **agricultural statistics:** the greening data are analysed, taking the total number of farms and areas in the EU, the Member State or the region as the total population. The dataset used in this document is the Eurostat Farm Structure Survey (FSS) data for 2013. This is the most recent dataset available and is based on a survey, whereas the 2010 FSS data were taken from the agricultural census. Eurostat annual statistics have been used to analyse the trends of land lying fallow. The time series considered range from 2010 to 2015. Data for 2015 were not yet available when the SWD on the review of greening after one year was completed.

⁴³ 2016 uptake data were received from 18 Member States (Belgium, Bulgaria, the Czech Republic, Denmark, Estonia, Spain, Croatia, Latvia, Lithuania, Luxembourg, Hungary, Malta, Austria, Poland, Portugal, Romania, Slovakia, Finland) and 2 UK regions (Wales and Northern Ireland).

⁴⁴ 2015 data were updated for Bulgaria, Austria, Poland, Finland and the UK (for Scotland). Some estimations were made on the data from Italy.

- **direct payments data:** in principle, greening is applied in all farms applying for direct payments, as it is an obligatory scheme under Regulation (EU) No 1307/2013. The total number of farms applying for direct payments is therefore the most accurate measure of the population these data are drawn from. Farms that are exempted from greening obligations, such as farms operating under the small farmer scheme and organic farms, are also beneficiaries of direct payments. The data for 2015 were not yet available for all Member States when this document was drafted. Data on direct payments for 2014 could be used, but as the number of beneficiaries in the direct payments system has also changed starting from claim year 2015, it is not possible to use these data throughout. That is why Eurostat FSS data for 2013 are used to represent the population in most of the analysis.

4.5. Classification of NUTS 3 regions based on EFA implementation data

Member States were asked to provide the **monitoring data on the uptake of greening at NUTS 3 level** (regions): in 2015, all the countries except France provided such data. NUTS 3 regions with no or non-reliable data were excluded from the analysis. For example, data were excluded for France, for which information are still missing, Italy, where errors on EFA areas figures were detected, and for individual NUTS 3 regions in other Member States.

All remaining **926 NUTS 3 regions were first automatically classified** using a '*k-means clustering algorithm*' on the distribution of the EFA types declared. This algorithm consists in partitioning observations into clusters in which each observation belongs to the cluster with the nearest mean, which then serves as a prototype of the cluster under analysis.

Changing the number of clusters in the algorithm showed that **using nine clusters was the optimal configuration** (i.e. the optimal compromise between homogeneity within the clusters and heterogeneity between the clusters, while still keeping the number of clusters low). These nine clusters were distributed as:

- **six** clusters with high cumulated percentages of **catch crops (CC)**, **nitrogen-fixing crops (NFC)** and **land lying fallow (LLF)**;
- **three** clusters with high cumulated percentages of **landscape features (LF)** and **buffer strips (BS)**.

In NUTS 3 regions with a high proportion of landscape features, landscape features are essentially represented by **hedges**.

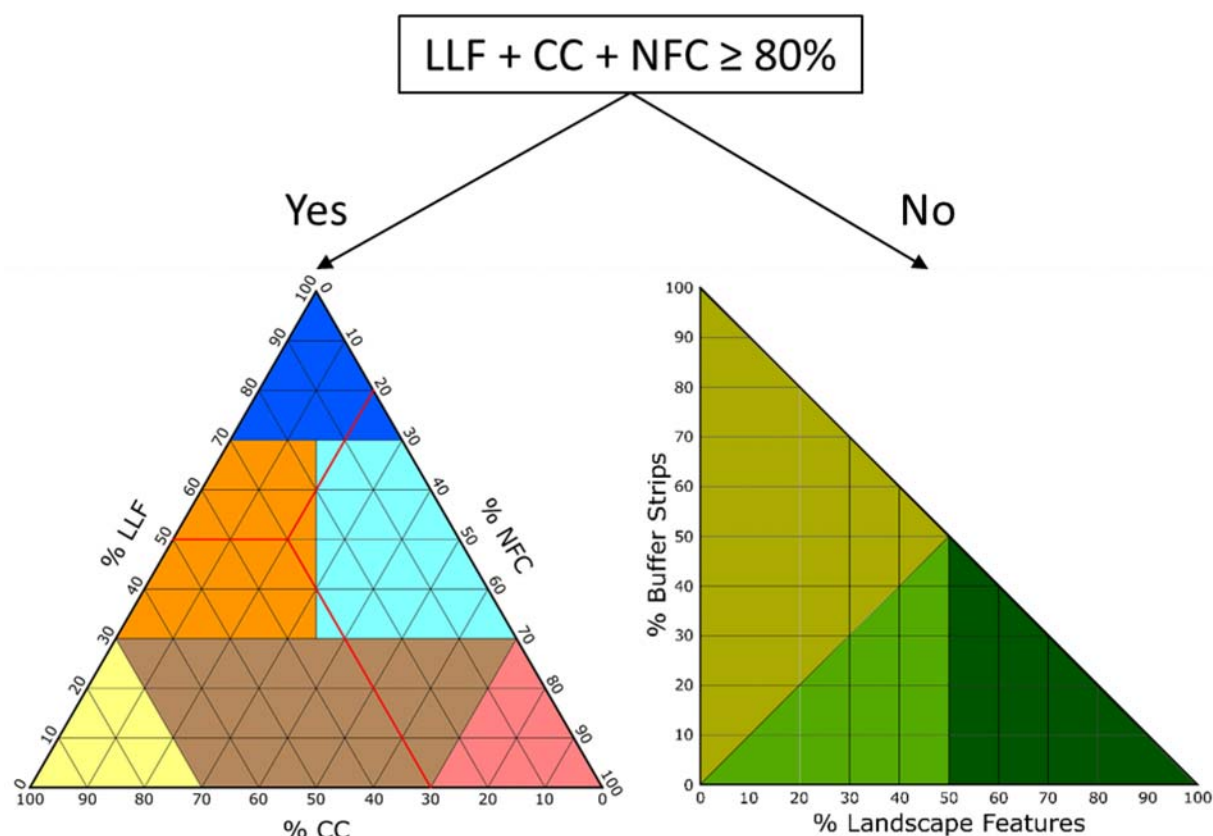
Based on this first exploratory analysis, the final nine categories were defined as rounded percentages of EFA types declared, as reported in Table 7 and Figure 1.

Table 7 Classification criteria of NUTS 3 regions

<i>Category</i>	<i>First sub-division</i>	<i>Second sub-division</i>	<i>Composition of EFA types</i>
1	LLF+CC+NFC < 80 %	LF ≥ 50 %	LLF+CC+NFC < 80 % - LF more than 50 %
2	LLF+CC+NFC < 80 %	LF < 50 % BS < LF	LLF+CC+NFC < 80 % - Relative abundance of LF
3	LLF+CC+NFC < 80 %	LF < 50 % LF < BS	LLF+CC+NFC < 80 % - Relative abundance of BS
4	LLF+CC+NFC ≥ 80 %	LLF ≥ 70 %	LLF+CC+NFC > 80 % - Prevalence of LLF
5	LLF+CC+NFC ≥ 80 %	CC ≥ 70 %	LLF+CC+NFC > 80 % - Prevalence of CC
6	LLF+CC+NFC ≥ 80 %	NFC ≥ 70 %	LLF+CC+NFC > 80 % - Prevalence of NFC
7	LLF+CC+NFC ≥ 80 %	LLF < 30 % mix of CC and NFC	LLF+CC+NFC > 80 % - Low LLF — Mix of CC and NFC
8	LLF+CC+NFC ≥ 80 %	30 % < LLF < 70 % NFC > CC	LLF+CC+NFC > 80 % — Intermediate LLF — Relative abundance of NFC
9	LLF+CC+NFC ≥ 80 %	30 % < LLF < 70 % NFC < CC	LLF+CC+NFC > 80 % — Intermediate LLF — Relative abundance of CC

Figure 1 helps to visualise this methodology. The red lines in the left triangle show a NUTS 3 region with more than 80 % for the sum of fallow land, catch crops and nitrogen fixing crops and 50 % of LLF, 30 % of CC and 20 % of NFC. The NUTS region therefore falls in category 9 as the percentage of LLF is included between 30 and 70 % and CC is prevalent over NFC.

Figure 1 Visual representation of the nine categories



4.6. Simulations of potential impact of EFA

4.6.1. EFA calculator - introduction

With the sparse and incomplete data availability, it is still very difficult to find and conduct very robust greening impact studies.

The Commission's Joint Research Centre (JRC) recently asked for an EFA calculator to be developed.

The calculator is a **farm-level tool** intended to raise farmers' awareness of the implementation of EFA and provide **guidance to them on EFA selection**. The software estimates for a specific farm what that farm's current level of performance is on biodiversity and ecosystem services, depending on its EFA share and composition.

Considering that the data reported by Member States to DG AGRI on greening implementation are available mainly at regional level and not for individual farms, it was decided to run a study on the potential impact of EFA implementation in the EU. The supporting assumption was to divert the farm tool from its original aim and run it at NUTS 3 level by **simulating the characteristics of EFA farms representative for each NUTS 3 region** in question (producing an **'average farm'**), using data reported by Member States.

By doing so, a rough estimate can be made of what the current possible impact of EFA is on biodiversity and ecosystem services in a specific NUTS 3 zone (through the **'average representative farm'**).

The EFA calculator is based on a large and robust **scientific review**. However, underlying assumptions for its use at regional level obviously place some **restraints** on the actual quantitative results and further analyses are needed to actually test its robustness. Nevertheless, it provides a useful method to catch an early estimate of the potential impact of greening.

4.6.2. Structure and foundation of the EFA calculator

The software, known as the '*EFA calculator*', was developed by the University of Hertfordshire and is coordinated by the JRC. For a detailed description of the tool and its scientific basis, see the final report of the study on the EFA calculator (Tzilivakis, J., et al. 2015).

The software estimates an **individual farm's current performance** on biodiversity and ecosystem services **depending on its EFA share and composition**. This makes it possible for a user to test changes in the composition and quantity of the EFA on the farm and to simulate what the resulting impact could be.

A literature review forms the foundation for the software tool. Over 350 papers, reports and guides were collated, reviewed and structured for the individual EFA types specified in the EFA legislation. The information from the literature review process was then converted into a form that could be used in the software. Ecosystem services and biodiversity were selected as a means of assessing the ecological benefit of EFAs.

For **biodiversity**, this analysis is based on the diversity and populations of species. For the latter, there is specific focus on the EFA's potential impact on enhancing populations. EUNIS species groups were used (EEA (2015b) (See Chapter 6.2.1).

The analysis concerning ecosystem services does not cover ecosystem disservices, where ecosystem functions are harmful to human well-being. However, it does cover negative impacts resulting from positive services (for example, creation of woodland may decrease water provision downstream in a catchment area). The Common International Classification of Ecosystem Services (CICES) system was followed (Haines-Young and Potschin, 2013) (See Chapter 6.2.1).

4.6.3. Impact scores

A bespoke scoring system was developed based on the **characteristics and potential impact of each EFA feature**. The latter (known as the '*feature impact*') was determined and is presented in Figures 2 and 3. Ticks in the matrix correspond to where evidence was found that the EFA feature has an impact (positive or negative) on the corresponding category of biodiversity groups or ecosystem services.

Figure 2 Broad impact matrix between EFA types and biodiversity EUNIS groups

Land/feature	Agroforestry	Ancient monuments	Ancient stones	Archaeological sites	Catch crops or green cover	Ditches	Fallow land	Garrigue	Hedges or wooded strips	Isolated trees	Land strips (adjacent/parallel to water)	Land strips (other)	Natural monuments	Nitrogen fixing crops	Ponds	Short rotation coppice	Terraces	Traditional stone walls	Trees in line	Woodland
Impact category																				
Biodiversity																				
Amphibians	✓				✓	✓	✓			✓	✓	✓		✓	✓	✓				
Aquatic plants						✓	✓								✓					
Biodiversity (general)						✓	✓								✓					✓
Birds	✓				✓	✓	✓		✓	✓	✓	✓		✓	✓	✓		✓	✓	✓
Fish						✓	✓								✓					
Fungi			✓															✓		✓
Invertebrates	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓		✓		✓
Lichens																		✓		✓
Mammals	✓				✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓		✓		✓
Reptiles			✓		✓	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓	✓		✓
Terrestrial plants	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓		✓

Figure 3 Broad impact matrix between EFA types and ecosystem services

Land/feature	Agroforestry	Ancient monuments	Ancient stones	Archaeological sites	Catch crops or green cover	Ditches	Fallow land	Garrigue	Hedges or wooded strips	Isolated trees	Land strips (adjacent/parallel to water)	Land strips (other)	Natural monuments	Nitrogen fixing crops	Ponds	Short rotation coppice	Terraces	Traditional stone walls	Trees in line	Woodland
Impact category																				
Ecosystem services																				
Provisioning:																				
Provision of water as a material																	✓			✓
Provision of water for nutrition																				✓
Regulation & maintenance:																				
Global climate regulation																				✓
Pollination & seed dispersal	✓					✓	✓	✓	✓		✓	✓		✓	✓	✓				✓
Pest control	✓				✓		✓		✓					✓	✓	✓			✓	
Chemical condition of freshwaters	✓				✓	✓	✓		✓		✓			✓	✓	✓			✓	✓
Flood protection						✓														✓
Mass stabilisation & control of soil erosion	✓				✓		✓				✓			✓		✓	✓			✓
Filtration/sequestration by flora and fauna									✓		✓								✓	
Mediation of smell/noise/visual impacts																			✓	
Cultural:																				
Aesthetic services		✓	✓	✓		✓			✓	✓			✓		✓		✓	✓		✓
Heritage & cultural services		✓	✓	✓						✓										

Each EFA feature may impact one or more group of species (biodiversity) and/or one or more ecosystem service. These impacts depend on a set of parameters, each one consisting of several classes which reflect the impact score.

For instance, to assess the potential impact of the EFA type fallow land on amphibians (Figure 4), the parameters used included:

- quality of adjacent water bodies (with classes such as no adjacency, good water quality, moderate water quality);
- ground cover (with classes such as bare soils, natural regeneration, sown bird seed mix).

Figure 4 Impact matrix for fallow land on amphibians

Adjacent water bodies quality		Score
No adjacent water bodies		0
Good (clear water abundant organisms)		100
Moderate (clear/partially discoloured, some organisms)		67
Poor (Partially discoloured, low number of organisms)		25
Very poor (Discoloured/green, negligible organisms)		0

Adjacent vegetation structure		Score
Large area (>1ha) of rough grassland, scrub, hedges or woodland		100
Small area (<1ha) of rough grassland, scrub, hedges or woodland		67
Short closely grazed grassland or arable crops		10
Large areas of bare ground		0

Adjacent wildlife corridors		Score
Diverse and complete linear features		100
Uniform linear features with gaps		50
No linear features		0

Ground cover (fallow)		Score
None (bare soil)		0
Natural regeneration		67
Sown bird seed mix		5
Sown wildflower		35
Sown grass only		67

Dist. density of adjacent water bodies		Score
>1.3 per km ²		100
1 per km ²		67
0.5 per km ²		50
0.1 per km ²		10
None		0

Parameters	Biodiversity	Amphibians	Reptiles	Seed eat	Small m	shrews,	Soil surft
Adjacent vegetation structure	✓	✓	✓	✓	✓	✓	✓
Adjacent water bodies quality	✓	✓	✓	✓	✓	✓	✓
Adjacent wildlife corridors	✓	✓	✓	✓	✓	✓	✓
Annual rainfall	✓	✓	✓	✓	✓	✓	✓
Distribution density of adjacent water bodies	✓	✓	✓	✓	✓	✓	✓
Field size	✓	✓	✓	✓	✓	✓	✓
Ground cover (fallow)	✓	✓	✓	✓	✓	✓	✓
Dist. density of adjacent water bodies	✓	✓	✓	✓	✓	✓	✓

Relative impact scores were derived for each feature-impact combination (as described above). Each feature impact was scored **on a scale of -100 to +100** for negative and positive impacts respectively. Two techniques were developed to score impacts:

- A **semi-quantitative approach** is used when the combinations of parameters are based on the quantified data. Scores were calculated for each of the possible combinations of relevant parameters then converted into a -100 to + 100 scale using a calibration table. This approach could only be applied to a few impacts (e.g. nitrate leaching and phosphate run-off, soil erosion).
- A **qualitative approach**, where scores are awarded for each class, then the scores for the classes selected are added together and weighted for each parameter. To make this approach less subjective, a protocol was used to derive scores and weights systematically, taking into account where possible existing scoring techniques,

indicators or indices in specialist literature. This approach was applied to impacts where the semi-quantitative approach could not be used.

On a scale of 100-0, the scores represent the potential impact that an EFA element can have on the ecosystem service or the biodiversity EUNIS species group. This ranges from the best impact (all parameters and classes fulfil the best condition) to no impact (the EFA elements do not fulfil any conditions for each parameter and related classes). Negative scores are calculated in the same way for negative impacts resulting from services.

4.6.4. The aggregation process

Given the range of potential impacts on ecosystem services and biodiversity and the number of impact indices and data, some aggregation was required to facilitate simple assessment and interpretation. **Positive and negative impact scores are averaged and aggregated separately.** This is to avoid potential negative impacts becoming hidden by being ‘cancelled out’ by positive scores (and vice versa). The aggregation process potentially results in four values: positive and negative values for ecosystem services and positive and negative values for biodiversity.

To make results comparable, these impact scores are also calculated per hectare. As described in the chapters that follow, the **impact scores per hectare** are the ones used in the analysis carried out in this study at NUTS 3 level. In this way comparison is possible as results are not influenced by farm size or by the size of the NUTS 3 regions.

In the EFA calculator, impacts are assessed not on the basis of a change from a baseline situation (baseline impact assessment) but on a functional basis (**functional impact assessment**). In a functional impact assessment, the assessment of performance would be concerned with the impact the EFA element (e.g. a hedge) has in terms of the functions and services it provides for both biodiversity and ecosystem services. This applies to both existing and new features (including features that may have been specifically created for EFA). **Performance will not be based on changes to a baseline.**

4.6.5. Use of the EFA calculator with NUTS 3 regions

As already mentioned, to analyse and understand the potential impact on the environment of the EFA types declared by farmers in the EU, it was decided to use the EFA calculator at NUTS 3 level, where a region was considered as ‘one farm’ represented by the average farm as declared within the corresponding NUTS 3 region.

Having made a rough estimate of the current possible impact of EFA on biodiversity and ecosystem services in a specific NUTS 3 zone through the average representative farm, it is then possible to make further analyses to estimate the potential impact of EFA in such region, depending on its general natural and semi-natural characteristics.

To use the EFA calculator at NUTS 3 level, three types of data were introduced into the calculator:

A. Characterisation of the NUTS 3 (whole farm parameters)

For the analysis at NUTS 3 level, the parameters that could be used are those **describing the NUTS 3 regions as a whole**: dominant soil texture, mean slope, mean annual rainfall, mean annual precipitation, risk of acid deposition, risk of nitrogen deposition, ecological zones, mean annual temperature, mean hydraulic conductivity of the soil, erosion risk in catchment.

Nevertheless, it was **not possible** to take into account in a regional context **some specific attributes and practices** linked to the EFA elements (such as floral diversity, landscape connectivity, hedge cutting season), which are relevant for assessing the impact on biodiversity and which can be used to fine-tune the EFA calculator scores.

B. Average farm size

The arable area of the ‘NUTS 3 farm’ was calculated as the average arable area of all farms implementing EFA in the specific NUTS 3 region.

C. Area of EFA types

The area of each EFA type for this ‘NUTS 3 farm’ was derived while maintaining the same proportion of the EFA types declared in the NUTS 3 region. For this, we used EFA implementation data 2015 notified by Member States to the European Commission at NUTS 3 level.

The EFA calculator **was run on 121 selected NUTS 3 regions**, selected as follows:

- Exclusion of Member States and NUTS 3 regions whose **data have not been notified** to the Commission or contained inconsistencies when the study was carried out (Italy, France, UK (Scotland));

Among the remaining NUTS 3 regions it was decided that the sample should contain:

- NUTS 3 regions covering **different** percentages of **EFA types declared**;
- NUTS 3 regions in **each ecological zone of the EU** (temperate oceanic forest, temperate continental forest, temperate mountain, boreal coniferous forest, boreal mountain, sub-tropical dry forest, sub-tropical mountain, temperate steppe);
- NUTS 3 regions that **present a potential risk** for biodiversity and ecosystem services due to specialist cereals systems or a low level of semi-natural vegetation;
- **neighbouring NUTS 3 regions** (clustering) in order to check that the EFA calculator provides similar outputs for similar NUTS 3 regions (i.e. same type of farming systems, landscapes, climate conditions etc.).

Among NUTS 3 regions selected there are regions with a high percentage of **farms exempted** from EFA (e.g. in Member States with an EFA forest exemption such as Sweden, Estonia, Latvia or with small farms like in southern Poland). Even if the percentage of the arable land affected by EFA in these regions is low, it was important to include them in the sample as the scores calculated by the tool are influenced by the region’s characteristics (soil, climatic data etc.). Excluding them would have made the sample less representative i.e. some ecological zones would have not been represented. Anyway, these regions will be excluded when analysing the results at territorial level due to the low potential effects that the EFA policy can have in areas with an insignificant number of farms implementing EFA.

Based on this NUTS 3 approach, the analysis was carried out for the nine aggregated and detailed impact categories referred to in Chapter 4.5 (see table on classification criteria of NUTS 3 regions).

4.6.6. Warnings and limits in the use of the calculator

The following assumptions and constraints should be kept in mind when analysing the results.

The EFA calculator is a farm level-based tool which uses literature findings and evidence to build an impact matrix. The impact scoring system draws upon a broad variety of different measures and metrics then harmonises them using a common scoring scale (-100 to +100). This means that the **results are not absolute** in terms of numbers, but they **depend on the circumstances of the farm described**. This also means that the results **do not indicate**, especially for biodiversity, **that any one EFA element is generically better than another EFA element** — this will depend on the circumstances in which it is applied.

When applying the EFA calculator at NUTS 3 level, it must be remembered that the **parameters describing the geographical context are considered** (even if as an average in the NUTS 3 region), whereas those related to **management factors and local landscape conditions** (e.g. floral diversity, landscape connectivity etc.) **are not taken into account**.

The scores calculated for each NUTS 3 region represent **potential impacts** generated by average regional data and are not based on the specific characteristics, management practices and landscape conditions of a real farm. Therefore these scores should **not be considered as absolute values** of the **actual impact of EFA implementation on the environment**. Instead they represent the potential impact on the environment of the EFA-type composition declared in the NUTS 3 region.

The software tool is structured in a way so that not all data has to be entered. However, **the more data entered, the more accurate the assessment of impact** will be. If not all data are entered, a range of potential impact values will exist for the feature, ranging from the best case to the worst. For the NUTS 3 level analysis, the software was set to **an average case** (following the precautionary principle). This makes it possible to calculate results even if some data are missing. Obviously the results obtained have less variability than those that can be calculated in a real farm. This is because the parameters referring to specific management factors and local landscape characteristics (e.g. connectivity) can fine-tune the impacts.

Another point to underline, and one which probably applies to all studies of this nature, is that the **evidence for the impacts is variable in terms of its quantity and robustness**. For some EFA elements, like hedgerows, there are already lots of studies. However, for others like nitrogen-fixing crops, there is less evidence for some impact categories, so we should bear in mind that scientific understanding of these latter could be improved.

In the EFA calculator reports, overviews are provided of the reliability of the scientific literature used for each impact categories and feature combinations.

4.7. Study requested by the Commission

The study ‘Mapping and analysis of the implementation of the CAP’⁴⁵ was commissioned by DG AGRI and undertaken in 2016. Its results were used in Chapter 6.1 covering drivers behind Member States' EFA choices.

The study focuses on the effects of implementation choices on the three main CAP objectives, analysing the motivation behind the choices and making a preliminary assessment of the implications for administrative burden and the overall likely policy impact to be expected.

The study also provided an exhaustive review of the choices made by the 28 Member States in both pillar 1 and pillar 2 of the CAP. For the mapping of Member State implementation choices, information available at the beginning of 2016 was used to produce ‘mapping fiches’ that describe the choices regarding both pillars in the 28 Member States. The main sources of information were Member States’ notifications to the European Commission on direct payments and the 118 rural development programmes (RDPs). Interviews in the 28 countries served to shed light on the main factors that influenced the decision-making process in each country. Member States were grouped in clusters following a typology based on an analysis involving a set of 12 indicators summarising the main implementation choices.

Answers to the evaluation questions were provided based on case study work conducted in 10 Member States (Bulgaria, Finland, France, Germany, Italy, Poland, Slovenia, Spain, the Netherlands and the United Kingdom). The results provided only a preliminary idea of the potential policy impact as the evaluation focused on the measures put in place in only 10 Member States or regions, and was not based on data of uptake or implementation by beneficiaries.

4.8. Other relevant scientific literature

Other literature was also considered when undertaking the exercise to assess the potential impact of EFA on environment and climate.

- ‘Ecological Focus Area choices and their potential impacts on biodiversity. Report for BirdLife Europe and the European Environmental Bureau’. This report, drawn up by the Institute for European Environmental Policy⁴⁶, focused on the potential biodiversity impacts of EFA on farmland, studying the literature evidence;
- Pe’er, G., et al., (2016), ‘Adding Some Green to the Greening: Improving the EU’s Ecological Focus Areas for Biodiversity and Farmers’. This evaluates the ecological effectiveness and farmers’ perception of the different EFA options using the combination of survey method analysis of the uptake data and socioeconomic factors influencing farmers’ decisions.
- ‘EIP-AGRI Focus Group on Ecological Focus Areas: Final report’. This is a study on how EFA and more specifically landscape features contribute to the profitability of arable crop production, based on the review of scientific literature.

⁴⁵ https://ec.europa.eu/agriculture/external-studies/mapping-analysis-implementation-cap_en.

⁴⁶ <http://www.ieep.eu/work-areas/agriculture-and-land-management/policy-evaluation/2016/12/ecological-focus-areas-what-impacts-on-biodiversity>.

Since greening and the related EFAs have only been in place since 2015, a full-fledged field study of the real impacts EFAs have on the environment was not yet possible. The above-mentioned studies rely on other sources than field data, so their outcomes have to be considered bearing in mind these limitations.