Technical paper N° 4/2015

Short topic assessment on Agriculture and Article 17 related data.

Analysis of Articles 12 and 17 reporting data from 2007-2012 for agricultural ecosystems

Kristijan Čivić, Celia García Feced and Sophie Condé

22/07/2015

Authors' affiliation:

Kristijan Čivić, European Centre for Nature Conservation (NL)
Celia García Feced, Muséum national d'Histoire naturelle (FR)
Sophie Condé, Muséum national d'Histoire naturelle (FR)

EEA project manager:

Sylwia Gawronska, European Environment Agency (DK)

ETC/BD production support:

Muriel Vincent, Muséum national d'Histoire naturelle (FR)

Citation:

Please cite this report as
Čivić, K., García Feced, C. and Condé, S., 2015. Short topic assessment on Agriculture and Article 17 related data. ETC/BD report to the EEA.

Contents

Short topic assessment on Agriculture and Article 17 related data

1   Key messages

- More than three quarters of the assessments of habitats associated with grassland ecosystem in Europe are in unfavourable conservation status and almost half of these are even further deteriorating.
- Non-bird species related to agricultural ecosystems (cropland and grassland) are also in a poor conservation status. However, there are also some examples of such species improving in their conservation status — e.g. several European ungulates.
- Situation is slightly better for all birds, also associated with agricultural ecosystems. Almost half of the species associated with agricultural ecosystems are considered as secure and slow levelling off of the downward trend is clearly present also according to the 'Common birds in Europe population index'. Unfortunately, more than two thirds of the birds that are considered as non-secure are also further decreasing.
- As expected, agriculture and agricultural practices are the most frequently reported pressures and threats to agricultural ecosystems and dependant species.
- EU's Common Agricultural Policy (CAP) has a significant impact on both agricultural ecosystems and species related to these. CAP has recently undergone some major changes (CAP Reform 2014-2020) so its effects will only be visible in the next round of Article 12 and 17 reporting in 2018.

2   Introduction

This Short Topic Assessment is based on the data prepared for EEA (EEA, 2015a) report 'State of nature in the EU — Results from reporting under the nature directives 2007-2012'. It should be noted that no Article 17 report was provided by Greece in 2013 and therefore figures for Greece date back to 2006. Also, the current report covers EU27, as at the time of reporting Croatia was not yet an EU Member State.

Statistics used in this report were prepared considering that agricultural ecosystems correspond broadly to a combination of the 'Cropland' and 'Grassland' MAES categories. It was also noted that, in reality, part of the habitats included under the MAES category 'Heathland and shrub' could also be considered as agricultural ecosystems, but in order to simplify the approach, these were not taken into account.

This report uses the following terminology:

- 'Agricultural ecosystems' always means croplands and grasslands following the MAES typology (unless mentioned differently);

- 'Species' always refers to those species that are listed in the Habitats or Birds Directive and are associated with agricultural ecosystems (unless mentioned differently);

- 'Habitats' always means habitat types that are associated with grassland ecosystem (Annex I of the Habitats Directive does not include cropland habitat types) (unless mentioned differently).

This document aims to bring together the relevant information on the agricultural ecosystems, and related species, in one concise document in an easily accessible language. Furthermore, it adds an element of assessment, offering analytical discussion from the factual information displayed in the figures.

The 1992 Habitats Directive (Directive 92/43/EEC), together with the 1979 Birds Directive (Directive 2009/147/EC), are the legal corner stone of the nature and biodiversity policy in the European Union (EU). The Habitats Directive aims at ensuring the conservation of a variety of rare, threatened, or endemic species, including more than 1250 species and sub-species and 233 habitat types considered to be of Community interest (these habitats and species are listed in the five annexes to the Directive). For the habitat types and species listed in Annex I & II of the Habitats Directive respectively, Member States (MS) must designate Sites of Community Importance (pSCI and SCI) and manage these as appropriate Special Areas of Conservation (SACs). On the other hand, the aim of the Birds Directive is to provide for the protection, management and control of naturally occurring wild birds and their nests, eggs and habitats within the European Union. It places great emphasis on the protection of habitats for endangered as well as migratory species (193 species and sub-species listed in Annex I), especially through the establishment of a coherent network of Special Protection Areas (SPAs). Natura 2000 ecological network is comprised by Special Areas of Conservation (SACs) designated under the Habitats Directive and Special Protection Areas (SPAs) designated under the Birds Directive.

Article 17 of the Habitats Directive and Article 12 of the Birds Directive call for Member States to regularly prepare and submit national reports on progress made in implementing the directives, and for the European Commission to produce a composite report based on these national reports: State of nature in the EU (EC, 2015).

Under the reporting of Article 12 of the Birds Directive, Member States provide (a) general information about the implementation of the directive, and (b) reporting on the size and trend of individual bird species' populations and distributions, including main threats and pressures affecting species, as well as coverage by the SPA network and conservation measures taken for them. Under the reporting of Article 17 of the Habitats Directive, each Member State provides both (i) general information about the implementation, and (ii) an assessment of the conservation status and trends of all species and habitats covered by the Habitats Directive, as well as supporting data such as population sizes of species and the surface area of habitats. Ideally the data for reporting would have been collected during the reporting period (the most recent: 2007-2012) and using compatible methods in all Member States. However, this was unrealistic and Member States have used data collected for a variety of purposes and over varying time periods. In many cases suitable data does not exist and expert opinion has been used to allow assessments of conservation status to be made. As a result, there is a wide range in the proportion of Member States assessments, for both species and habitats, reported as 'Favourable' or 'Unfavourable'. Some of this variation reflects real differences in their condition, but an indeterminate proportion is due to differing approaches and methodologies. Details about the reporting processes are described in the most recent 'State of nature in the EU: Results from reporting under the nature directives 2007–2012' report (EEA, 2015a).

Agriculture is at the heart of the European Commission's strategy to halt the loss of biodiversity and ecosystem services in the EU by 2020. The EU 2020 Biodiversity Strategy consists of six mutually supporting and inter-dependent targets and 20 actions responding to the objectives of the 2020 biodiversity headline target, and aims at halting biodiversity loss and the degradation of ecosystem services (EC, 2011a). Targets 2([1]) and 3([2]) of the strategy focus, respectively, on: green infrastructure

---

[1] Target 2: *By 2020, ecosystems and their services are maintained and enhanced by establishing green infrastructure and restoring at least 15% of degraded ecosystems.*
[2] Target 3A: *Agriculture: By 2020, maximise areas under agriculture across grasslands, arable land and permanent crops that are covered by biodiversity-related measures under the CAP so as to ensure the conservation of biodiversity and to bring about a measurable improvement(*) in the conservation status of species and habitats that depend on or are affected by agriculture and in the provision of ecosystem services as compared to the EU2010 Baseline, thus contributing to enhance sustainable management.*

and the restoration of degraded ecosystems; and increasing the contribution of agriculture (and forestry) to maintaining and enhancing biodiversity and ecosystem services. Agriculture clearly has a significant role to play with 38% of protected areas that comprise the Natura 2000 series relying on traditional or other agricultural management in order to maintain or establish their favourable conservation status (EEA, 2010a) ([3]).

Frequent and reliable monitoring is needed to follow the progress towards reaching these targets and to adequately address shortcomings in the protection of habitats and species, and if relevant outline necessary actions and measures to address them. In this context, the findings from the assessment of Article 17 reporting, provide us with a first indication of how the EU is progressing towards, in this case, the conservation of agricultural ecosystems and therefore also as a proxy for progress towards the target 3-A (Agriculture).

According to the Millennium Ecosystem Assessment 'an ecosystem is a dynamic complex of plant, animal, and micro-organism communities and the non-living environment interacting as a functional unit' (MEA, 2005). This report considers only agricultural ecosystems. However, the approach to selecting the agricultural ecosystems, and especially drawing these connections for species, is not that straight forward. Some species use different ecosystems during their life cycle or across seasons. In addition, their ecological requirements may differ depending on the biogeographical context in which they are found. In order to aid this process, a reference dataset was developed by the EEA-ETC/BD (EEA, 2014c) where all habitats and species covered by the Habitats Directives are allocated to ecosystem types as defined by the 'Mapping and Assessment of Ecosystems and their Services' (MAES) typology described in EC (2013a).

Within the report and based on the increasing focus on ecosystems in biodiversity policy (as suggested by Target 2 of the EU 2020 Biodiversity Strategy) the analysis in this document follows the MAES typology of ecosystems when selecting the agricultural ecosystems. In the past this kind of analysis was made based on a list of 'habitats of European importance dependent on agricultural practices' published in Halada et al. (2011). In this list, in addition to most habitats included under the 'Grassland' MAES category, a few Annex I heathlands and wetlands habitat types were also considered. The MAES typology includes 10 Corine land cover (CLC) classes (level 3) belonging to the ecosystem type cropland and two belonging to grassland (Table 1),

Table 1: Corine land cover (CLC) classes (level 3) belonging to the cropland and grassland ecosystem types

CLC level 3	MAES ecosystem type
2.1.1. Non-irrigated arable land	Cropland
2.1.2. Permanently irrigated land	Cropland
2.1.3. Rice fields	Cropland
2.2.1. Vineyards	Cropland
2.2.2. Fruit trees and berry plantations	Cropland
2.2.3. Olive groves	Cropland

---

[3] Target 1: *To halt the deterioration in the status of all species and habitats covered by EU nature legislation and achieve a significant and measurable improvement in their status so that, by 2020, compared to current assessments: (i) 100% more habitat assessments and 50% more species assessments under the Habitats Directive show an improved conservation status; and (ii) 50% more species assessments under the Birds Directive show a secure or improved status.*

2.3.1. Pastures	Grassland
2.4.1. Annual crops associated with permanent crops	Cropland
2.4.2. Complex cultivation patterns	Cropland
2.4.3. Land principally occupied by agriculture, with significant areas of natural vegetation	Cropland
2.4.4. Agro-forestry areas	Cropland
3.2.1. Natural grassland	Grassland

2.1 Agricultural ecosystems in the European Union

Cropland ecosystem includes regularly or recently cultivated agricultural, horticultural and domestic habitats and agricultural ecosystems with significant coverage of natural vegetation (agricultural mosaics) (EC, 2013a). Croplands are not only the source of food, feed, fibre, and fuel for humans but, as a widespread type of ecosystem, is also an important habitat and provides a wide variety of essential ecosystems services ranging from pollination to landscape values (EC, 2014). Cropland covers some 25 % of the mainland of the EU 27 territory (Eurostat, 2012b). It is important to note that there is no Annex I habitat type linked to the cropland ecosystem type since Annex I only lists natural and semi-natural habitats.

Grasslands are areas dominated by two kinds of grassy vegetation (including tall forbs, mosses and lichens), i) managed pastures and ii) natural and semi-natural (extensively managed) grasslands (EC, 2013a). Grasslands are widely distributed in the EU, although natural grasslands are mostly restricted to areas above the treeline in the mountains; in other areas, grasslands are a result of human activity and without continued management would transition into woodland (Halada, L'. et al., 2011). Grasslands cover approximately 10 % of the EU land area (ETC/BD 2011) and provide a variety of services, including fodder for livestock, regulation and maintenance services and some cultural services (EC, 2013a). 45 Annex I habitat types are included in the MAES grassland ecosystem (see Appendix 1 for the full list).

2.2 Species associated with agricultural ecosystems

The number of non-bird species associated with cropland and grassland ecosystems in the Habitats Directive are respectively 34 and 309 (EEA, 2015a). There is a higher number of non-bird species associated with agricultural ecosystems in the Mediterranean and Continental regions, as these are also the two regions with the majority of EU agricultural areas (EEA, 2014a). A high number of such species in the Alpine region could be explained by the fact that the most of European biodiversity hotspots are in mountain areas, often with a high level of endemism and presence of very specific flora and fauna. This is the reason why species from this region comprise a significant share among the species listed in the annexes of the Habitats Directive (almost 30 %) (EEA, 2010b). Moreover valuable non-bird species are connected with High Nature Value farmland areas through extensively managed habitats (Figure 1).

Croplands and grasslands in Europe harbour the greatest diversity of birds, with no fewer than 173 species considered to be dependent on agricultural ecosystems (EC, 2011b). The Birds Directive includes 78 bird species associated with croplands and 75 with grasslands (EEA, 2015a). The number of birds associated with each ecosystem is therefore much more similar than in the case of non-bird species of the Habitats Directive, where there is a large difference in number of species (34 in croplands compared to 309 in grasslands). In addition, across EU there are also 37 bird species classified as common farmland birds index (EBCC, 2012).

Figure 1: Estimated High Nature Value (HNV) farmland in Europe
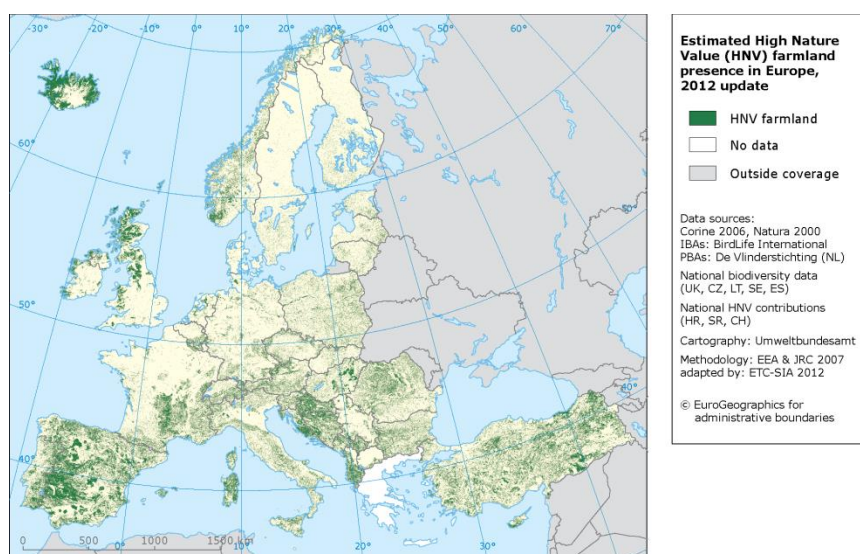
Source: (EEA, 2014b)

3 Status and trends

In the Habitats Directive, the conservation status of a particular species or habitat is classified based on an evaluation of four parameters: a) for species: range, population, suitable habitat and future prospects; b) for habitats: range, area, structure and functions, and future prospects. The parameters are collected by the Member States and assessed according to an agreed evaluation matrix (EC, 2005), leading to an overall conservation status assessment in four classes (Table 2) (EEA, 2015a)

Table 2: Habitats Directive conservation status classes

Habitats and non-bird species conservation status class
Favourable[4]
Unknown
Unfavourable - inadequate[5]
Unfavourable - bad[6]

The trends in conservation status of habitats and non-bird species with unfavourable status are classified as shown in Table 3.

---

[4] The habitat or species can be expected to prosper without any change to existing management or policies.

[5] A change in management or policy is required to return the habitat type or species to favourable status, but there is no danger of extinction in the foreseeable future.

[6] Habitats or species are in serious danger of becoming extinct (at least regionally).

Table 3: Habitats Directive trends in conservation status classes

Qualifier classes for assessing trends in the overall unfavourable conservation status of habitats and non-bird species
Improving
Unknown
Stable
Declining

With respect to the Birds Directive, the assessment of the population status at EU level is based on the population size and trends reported by Member States. The four population status classes used for birds (Table 4) are based on the scientific criteria developed to determine risks of extinction that were used to establish Species Red Lists by IUCN (EEA, 2015a).

Table 4: Birds Directive population status classes

Birds population status class
Secure
Unknown
Near threatened, declining or depleted
Threatened (i.e. vulnerable, endangered, critically endangered, regionally extinct)

The trends in population status of bird species with non-secure status are classified as shown in Table 5.

Table 5: Birds Directive trends in population status classes

Population trend for species under the Birds Directive
Increasing
Uncertain/Unknown
Stable/Fluctuating
Decreasing

3.1   Status and trends at EU biogeographical level

The European Union has nine biogeographical regions, each with its own characteristic blend of vegetation, climate and geology ([7]). For habitats and non-bird species, Member States assess the status for each of the biogeographical regions that are represented in their country. This section is based on the conservation status of habitats and species assessed at EU biogeographical level.

3.1.1   Conservation status and trends of habitats

Looking at the conservation status assessments (158 assessments) of habitats associated with grassland ecosystem (Figure 2), these were significantly less favourable compared to grassland related species. Only 11% of the assessments were favourable while nearly half of the assessments (49%) were unfavourable-bad. Additional 37% of the assessments are unfavourable-inadequate, which combined means that more than three quarters of the assessments (86%) were unfavourable.

---

[7] Source: http://ec.europa.eu/environment/nature/natura2000/sites_hab/biogeog_regions/index_en.htm

The intensity of the agricultural land-use and the proportion of habitats related to MAES agricultural ecosystems assessed as 'unfavourable‑bad' seem to be related (according to the map 3.4 Land management intensity of croplands derived from crop statistics and related nitrogen application in EEA, 2015b, and map 6.2 Proportion of habitats linked to MAES agricultural ecosystems assessed as 'unfavourable‑bad' in Member State reports of the State of nature in the EU — EEA, 2015a). This is particularly the case across the north-west of Europe and the continental region of Italy (the River Po Valley specifically).

Figure 2: Conservation status and trends of habitats associated with grassland ecosystem (% of number of assessments)
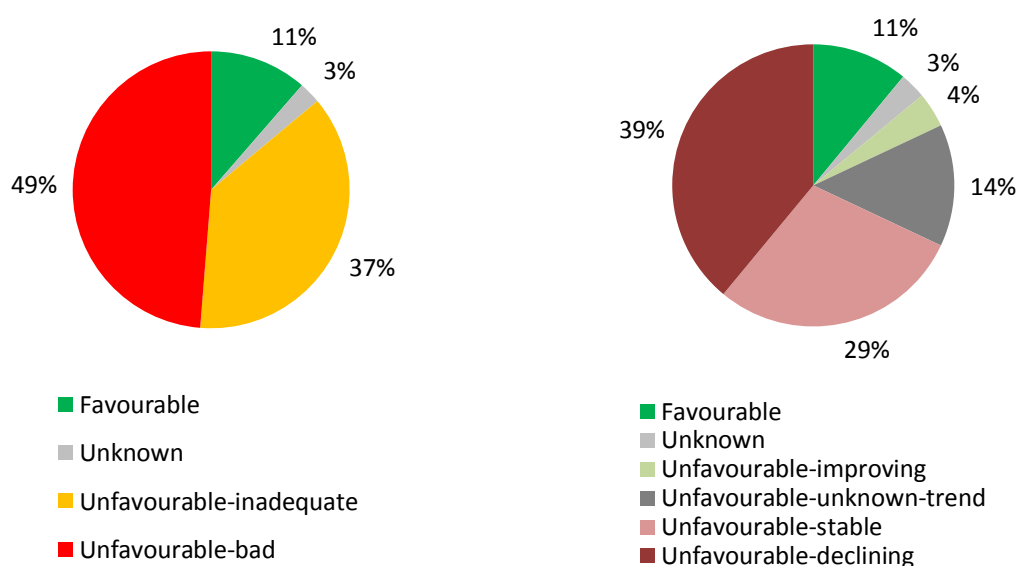
For example, in the case of habitat 6440 - *Alluvial meadows of river valleys of the Cnidion dubii* across the Continental region, while reported as 'favourable' by Romania, it is assessed as 'unfavourable-bad' in four central and western European countries (i.e. Austria, Czech Republic, Germany and France). Similar situation is with the habitat type 6410 - *Molinia meadows on calc./peaty/clavey-silt-ladean soils* which is assessed as 'favourable' by Bulgaria and Romania, but as unfavourable in 11 other EU Member States where it occurs — in nine of them as 'unfavourable bad' (four previously mentioned countries, Slovenia, and four north-western Member States Belgium, Denmark, Luxemburg, and Sweden).

Observing the trends in conservation status, a significant share of unfavourable assessments is further declining (39%), with a similar share of the assessments which are unfavourable but stable (29%). Unfortunately, the share of unfavourable assessments that are improving is only 4% (Figure 2).

Regarding the trends for the above mentioned two habitats, 6440 seems to show some signs of improvement, as an improved conservation status, although still not favourable, is reported by Czech Republic and Hungary. 6410 in Portugal on the other hand, was reported as favourable in the previous reporting round, but seem to have deteriorated to unfavourable status according to the latest report.

3.1.2 Conservation status and trends of non-bird species

The majority of the assessments of conservation status for both cropland (50 assessments) and grassland (609 assessments) related species from the Habitats Directive are also unfavourable (Figure 3, left). Out of these, nearly half are assessed as unfavourable-inadequate (47 and 50% respectively),

which is comparable with the assessments of habitats, while there is significantly less unfavourable-bad assessments (17 and 20% compared to 49% in habitats). Also, there are slightly more assessments assessed as favourable (20% for both grassland and cropland) than unfavourable-bad. This is also almost double the amount of favourable assessments when compared to habitats (11%). A relatively high amount of assessments (16% of grassland and 10% of cropland) are assessed as unknown.

Figure 3: Conservation status and trends of non-bird species associated with cropland and grassland ecosystems (% of number of assessments)

Cropland: conservation status
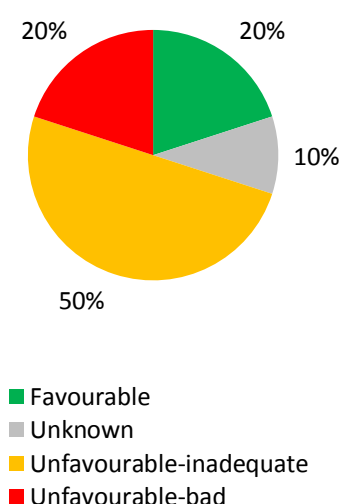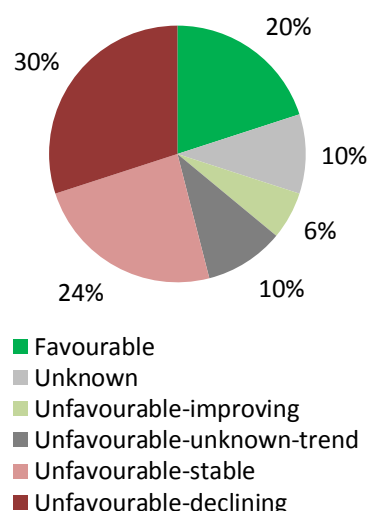
20% 20%
10%
50%

- 🟩 Favourable
- ⬜ Unknown
- 🟨 Unfavourable-inadequate
- 🟥 Unfavourable-bad

Cropland: trends in conservation status

30% 20%
10%
6%
24% 10%

- 🟩 Favourable
- ⬜ Unknown
- 🟩 Unfavourable-improving
- ⬛ Unfavourable-unknown-trend
- 🟥 Unfavourable-stable
- 🟥 Unfavourable-declining

Grassland: conservation status

17% 20%
16%
47%

- 🟩 Favourable
- ⬜ Unknown
- 🟨 Unfavourable-inadequate
- 🟥 Unfavourable-bad

Grassland: trends in conservation status

21% 20%
16%
4%
23% 16%

- 🟩 Favourable
- ⬜ Unknown
- 🟩 Unfavourable-improving
- ⬛ Unfavourable-unknown-trend
- 🟥 Unfavourable-stable
- 🟥 Unfavourable-declining
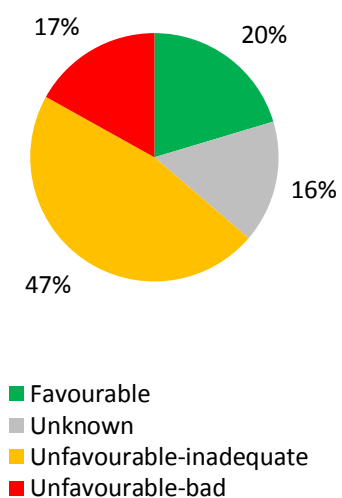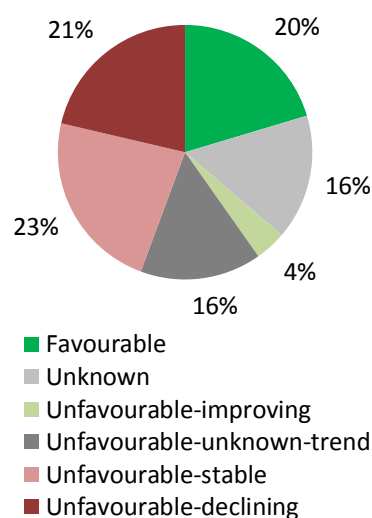
Somewhat less favourable picture for grassland habitats, when compared to the grassland non-bird species may partially be explained by the significantly lower share of unknown assessments for grassland habitats compared to grassland non-bird species (3 % vs. 16 %).

As for the trends in conservation status, almost a quarter of the assessments is, comparable to the situation with habitats (29%), assessed as unfavourable-stable (23 and 24% for grassland and cropland respectively) (Figure 3, right). However, there are significantly less assessments that were unfavourable-declining in grasslands and somewhat less in cropland (21 and 30% compared to 39% by habitats). In regards to the assessments that were unfavourable-improving, in all cases these were only between 4 and 6%.

When analysing the conservation status of species per taxonomic group the worse situation seem to be with non-vascular plants for which all assessments were unfavourable (50% inadequate and 50 bad). All other groups have similar numbers of favourable and unfavourable-bad assessments ranging between 15 and 30% of assessments (amphibians had no reported unfavourable-bad assessments, but a high percentage of assessments were unfavourable-inadequate — 85%).

According to the Grasslands butterfly indicator for Europe[7], between 1990 and 2011, populations of grassland butterflies declined by almost 50%, indicating a dramatic loss of grassland biodiversity (EEA, 2015c).

However, there are also some indications of species dependant on agricultural improving in their conservation status. For example several European ungulates — Alpine and Iberian ibex (*Capra ibex, Capra pyrenaica*), Southern and Northern chamois (*Rupicapra pyrenaica, Rupicapra rupicapra*), Roe deer (*Capreolus capreolus*) and Red deer (*Cervus elaphus*) — have improved in abundance and range and are not considered as threatened species any more. This is a result of numerous protection, management and restoration measures undertaken in the recent years (Deinet, S. et al., 2013 and IUCN, 2011).

A significant impact on the conservation status of both agro-ecosystems and species related to these has the EU's Common Agricultural Policy (CAP). Significant reforms to CAP have been made in recent years, notably in 2003 and during the CAP Health check in 2008. The most recent CAP reform (CAP Reform 2014-2020) has only been formally adopted by the EU Council of Agriculture Ministers in December 2013, so its effects may only be visible in the next round of Article 12 and 17 reporting in 2018.

Given the pressure on natural resources, the new CAP is aiming to enable agriculture to improve its environmental performance through more sustainable production methods. This improved sustainability should be achieved by the combined and complementary effects of various (financial) instruments: i) a simplified and more targeted cross-compliance, representing the compulsory basic layer of environmental requirements and obligations to be met in order to receive full CAP funding; ii) from 2015 onwards, the CAP introduces a new policy instrument in Pillar 1, the Green Direct Payment; iii) building on these compulsory elements, rural development will continue to play a pivotal role in achieving the CAPs environmental objectives and in combating climate change (EC, 2013b).

3.1.3 Population status and trends of bird species

Looking at the population status of birds associated with agricultural ecosystems (78 and 75 assessments for cropland and grassland respectively), about half of the species are considered as secure in both ecosystems (Figure 4, left). However, the share of threatened species is higher in grasslands (23%) than in croplands (12%).

The short-term trends in population status show that 39% (cropland) and 45% (grassland) of the species that are considered as non-secure are also further decreasing (Figure 4, right). In both

ecosystems, the percentages corresponding to increasing and stable/fluctuating trends are around 25%.

Figure 4: Population status (left) and short-term trends (right) of bird species associated with agricultural ecosystems (cropland and grassland) (% of number of assessments)

Cropland: population status

- Secure
- Unknown
- Near Threatened, Declining or Depleted
- Threatened

Cropland: short-term trends

- Increasing
- Uncertain/Unknown
- Stable/Fluctuating
- Decreasing

Grassland: population status

- Secure
- Unknown
- Near Threatened, Declining or Depleted
- Threatened

Grassland: short-term trends

- Increasing
- Uncertain/Unknown
- Stable/Fluctuating
- Decreasing
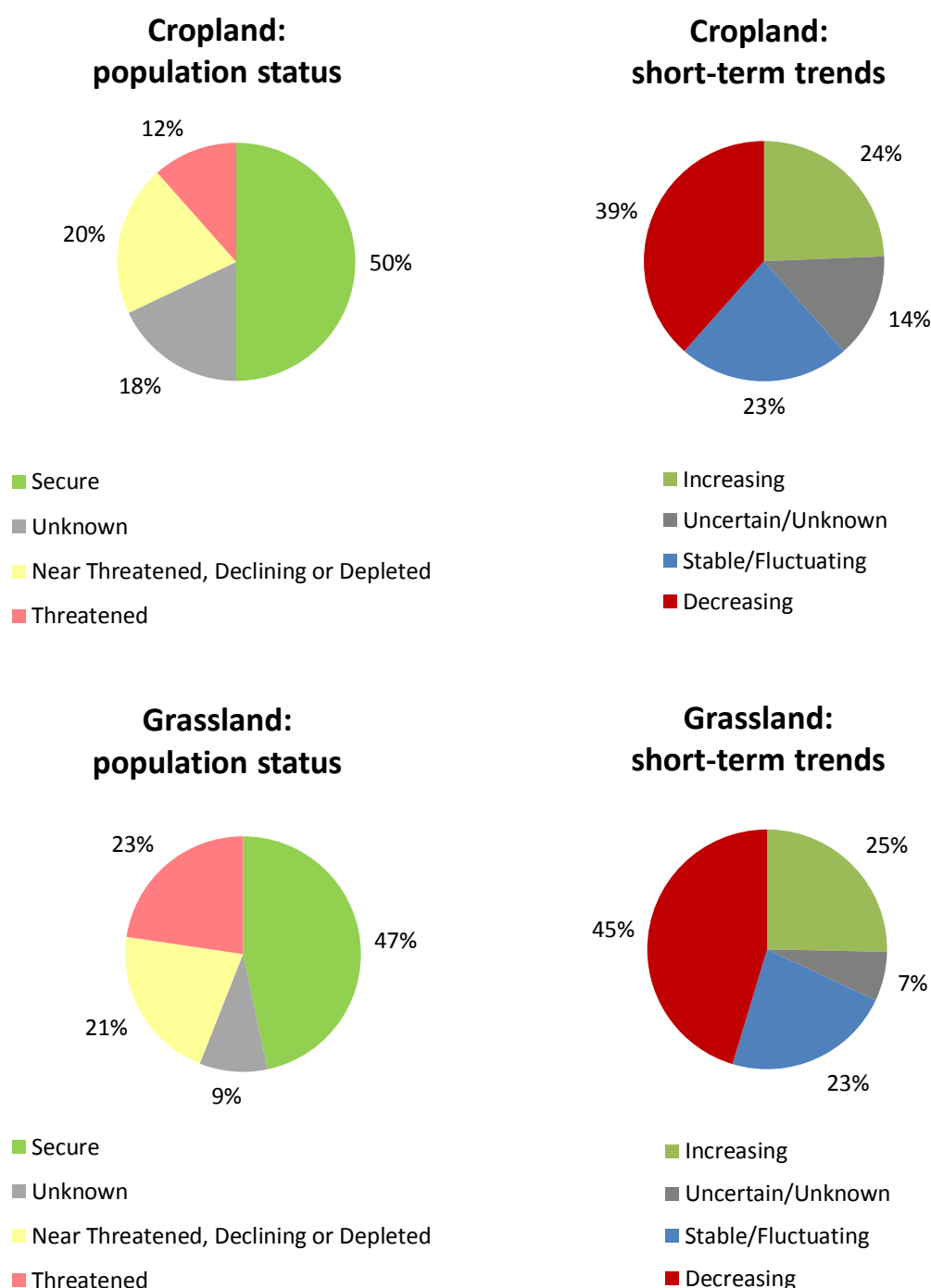
These results confirm what the Common farmland bird index, which shows trends in the abundance of common farmland birds over time across their European ranges[8], is indicating. Since 1990, common farmland birds in Europe have declined by 30%. This trend is still declining, however, a slow levelling off of the downward trend is clearly present (Figure 5) (EEA, 2015d). This has been linked to increased specialisation and intensification as well as habitat loss (EEA, 2015c).

Figure 5: Common birds in Europe population index

Chart — Common Birds in Europe, population index (1990 = 100)

- All common birds (163 species)
- Common forest birds (33 species)
- Common farmland birds (39 species)
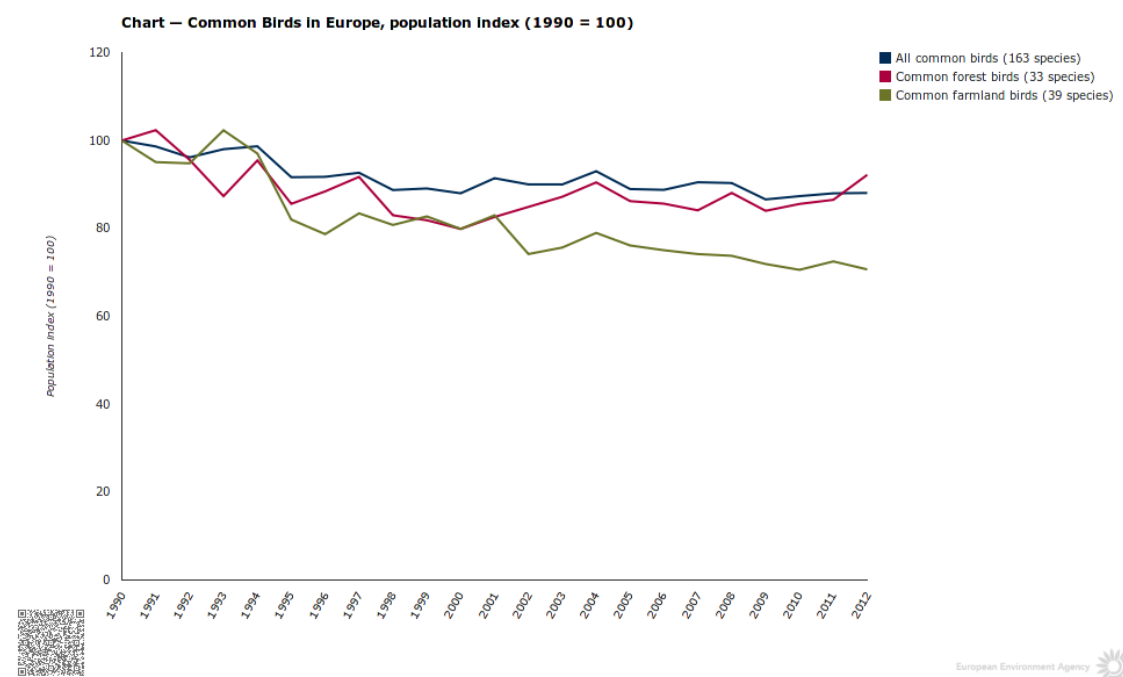
Source: SEBI indicator 001 - Abundance and distribution of selected species (EEA, 2015d)

There are recent studies that show the effects of changing agricultural practices on farmland birds. One such study in Sweden showed that overall abundance of 16 common species declined by 23% between 1994 and 2004 (especially pheasant (*Phasianus colchicus*), red-backed shrike (*Lanius collurio*) and reed bunting (*Emberiza schoeniclus*)), which may be partly caused by changes in land use, such as an increase in the amount of wheat cropland. The year 1994 marked the end of a period in which low-intensity farming was promoted in Sweden to counter overproduction and agricultural production has been increasing ever since. However, effects vary between species, and some species stayed stable or even increased in number (e.g. woodpigeon (*Columba palumbus*), white wagtail (*Motacilla alba*) and common starling (*Sturnus vulgaris*)). The study concludes that both land use change and landscape settings can affect local abundance of farmland birds. However, the effects are very species specific (Berg et al., 2015).

According to the data on trends of common birds in Europe (EBCC, 2014), some farmland related bird species have steep declining trends: ortolan bunting (*Emberiza hortulana*) shows a decrease in its

---

[8] This information is part of the SEBI indicator 001 - Abundance and distribution of selected species.

long-term trend[9] of 88% and crested lark (*Galerida cristata*) and grey partridge (*Perdix perdix*) of even more than 90%.

While most of the farmland related species according to this data seem to be decreasing, there are some species that are showing increasing trends (e.g. rook (*Corvus frugilegus*), cirl bunting (*Emberiza cirlus*) or common whitethroat (*Sylvia communis*)) (EBCC, 2014). Further examples of significant improvement of farmland related bird species across Europe include: whooper swan (*Cygnus cygnus*), white stork (*Ciconia ciconia*), lesser kestrel (*Falco naumanni*), saker falcon (*Falco cherrug*) or eastern imperial eagle (*Aquila heliaca*) (Deinet, S. et al., 2013).

3.2   Conservation status by biogeographical region

This section presents the results of the biogeographical assessments detailed by biogeographical region. Birds are not presented, as Member States only report population trends of birds at the country level.

3.2.1   Habitats

When looking at the situation with habitats associated with grassland ecosystem by biogeographical region (Figure 6), they seem to have the worst conservation status in Boreal region (with almost 90% of assessments being unfavourable-bad) and the best in the Steppic region where almost 85% of assessments were favourable. Second highest percentage of favourable assessments was in Macaronesian region (close to 35%). However, in the other regions, on average the percentage of unfavourable assessments is very high (ranging between 85 and 95% of assessments).

Figure 6: Conservation status of habitats associated with grassland ecosystem by biogeographical region (% of number of assessments)

---
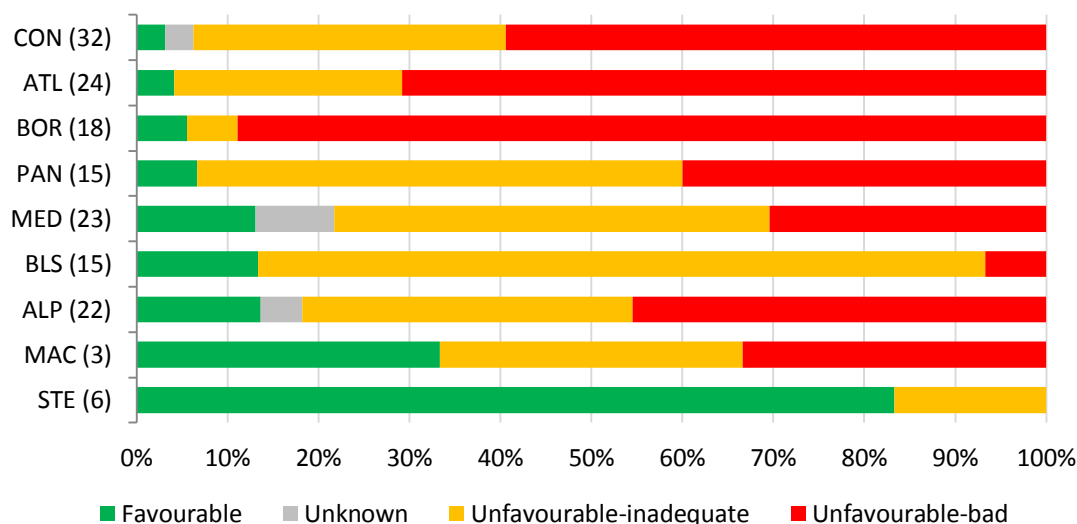
[9] Long-term trend (%) - change (in %) in an index value between the first and the last year of a time period. Long-term trend (%) is calculated over the period 1980-2012,

3.2.2 Non-bird species

For species related to agricultural ecosystems situation per biogeographical region seems to be quite the opposite compared to the habitats (Figure 7). The lowest share of favourable assessments for species is found in Steppic region (just under 15%), while it was highest for grassland habitats, and the highest in Black Sea region (more than 35%).

Five regions (Steppic, Pannonian, Continental, Boreal and Alpine) have more than 60% of the assessments in an unfavourable status. Atlantic and Boreal regions have almost 20% of unfavourable-bad assessments, while this is also the case for almost 40% of the assessments in Macaronesian region.

In addition, more than 40% of assessments in Mediterranean and Macaronesian regions and some 20% in Atlantic region are still unknown, making it difficult to get the real picture.

Figure 7: Conservation status of non-bird species associated with agricultural ecosystems (cropland and grassland) by biogeographical region (% of number of assessments)
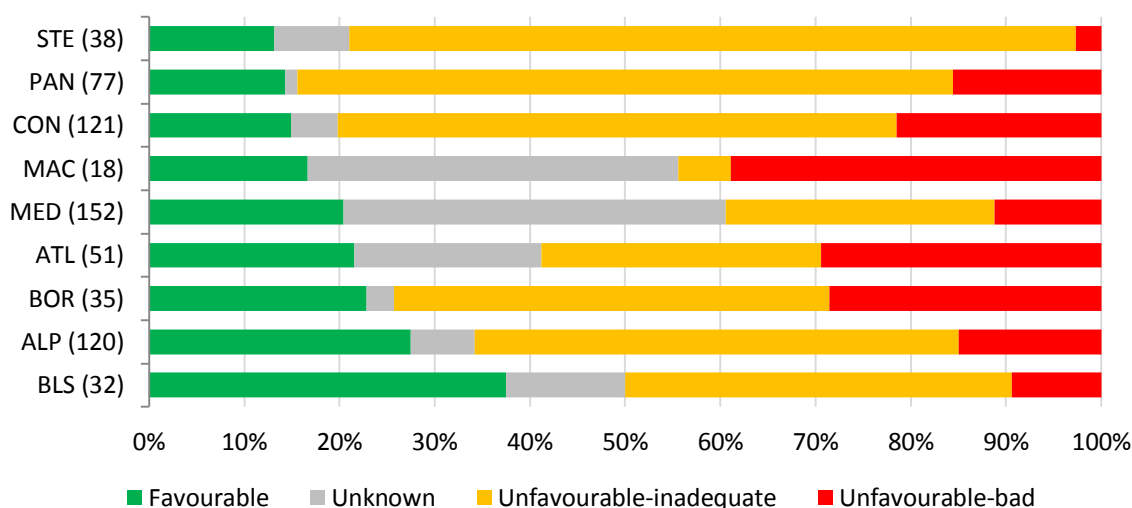
If we look at some examples of individual species, the reptile European green lizard (*Lacerta viridis*), reported for seven biogeographical regions, is assessed as in favourable conservation status only in one region (Black Sea) and as unfavourable in the other six. The mammal European ground squirrel (*Spermophilus citellus*) has unfavourable conservation status across its reported distribution — across nine biogeographical regions.

4 Changes in conservation status in relation to previous reporting period

4.1 Changes in conservation status at EU biogeographical level

Changes in conservation status in the current chapter are based on a specific analysis comparing overall data between the two reporting periods — 2001-2006 and 2007-2012 (EEA, 2015a).

4.1.1 Habitats

Situation with changes in conservation status for grassland habitats (Figure 8) is comparable to the general picture for all habitats with 46% of unfavourable and unknown assessments that did not change, compared to 48% for all habitat assessments (Table 6.2 in EEA, 2015a). Still, a very large proportion of assessments (39%) have deteriorated in comparison with the previous reporting period (2001-2006), with only 4% of improved assessments.

Figure 8: Conservation status (left) and changes in conservation status (right) of Annex I habitats associated with MAES agricultural ecosystems (cropland and grassland) (% of number of assessments)

Legend (left):
- ■ Favourable
- ■ Unknown
- ■ Unfavourable-inadequate
- ■ Unfavourable-bad

Legend (right):
- ■ Favourable assessments
- ■ Improved assessments
- ■ Assessments which have deteriorated
- ■ Unfavourable and unknown assessments that did not change
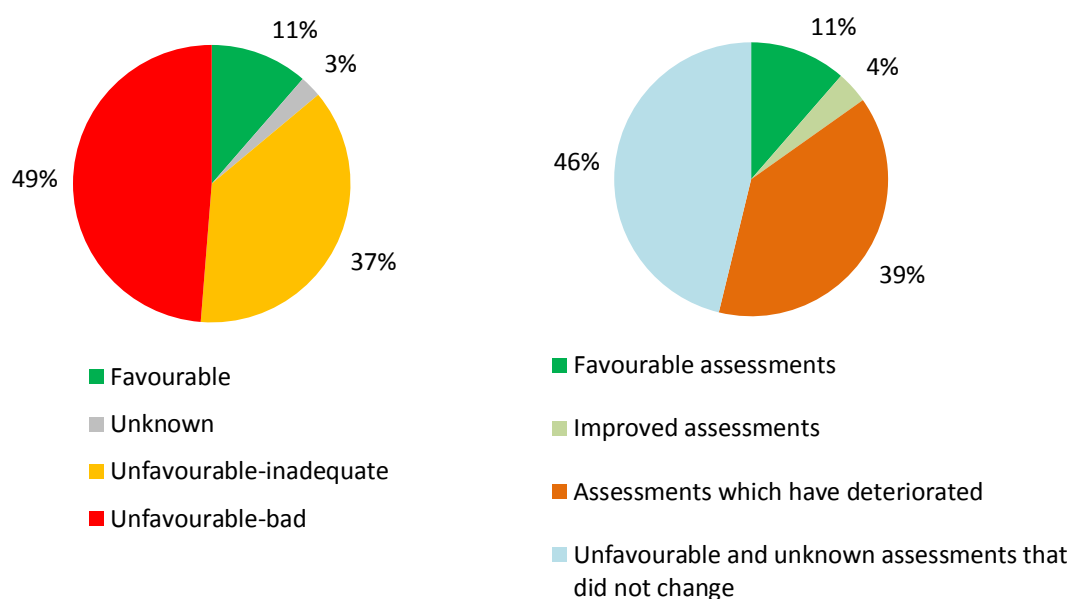
4.1.2 Non-bird species

For non-bird species the proportion of assessments that are unfavourable or unknown and did not change, when compared to the previous reporting period, is even higher (53%) (Figure 9). However there is somewhat lower percentage of deteriorated assessments 22% (compared to 39% for grassland habitats).

Among the agricultural ecosystems related non-bird species there is a relatively high share of favourable assessments (almost double compared to grassland habitats: 20% compared to 11%), but almost equal proportion of assessments deteriorated in the same period (22%).

Figure 9: Conservation status (left) and changes in conservation status (right) of non-bird species associated with MAES agricultural ecosystems (cropland and grassland) (% of number of assessments)


Left pie chart:
- 20% Favourable
- 16% Unknown
- 47% Unfavourable-inadequate
- 17% Unfavourable-bad

Legend (left):
- Favourable
- Unknown
- Unfavourable-inadequate
- Unfavourable-bad

Right pie chart:
- 20% Favourable assessments
- 4% Improved assessments
- 22% Assessments which have deteriorated
- 53% Unfavourable and unknown assessments that did not change
- 1% Assessments that became 'unknown'

Legend (right):
- Favourable assessments
- Improved assessments
- Assessments which have deteriorated
- Unfavourable and unknown assessments that did not change
- Assessments that became 'unknown'

4.2   Changes in conservation status by biogeographical region

4.2.1   Habitats

Looking at the situation at biogeographical region level (Figure 10), only four regions (Continental, Atlantic, Boreal and Pannonian) show some improvement in the assessments and (in all cases less than 10%).

In Boreal region some 80% of the assessments seem to be deteriorated, while in four regions (Atlantic, Mediterranean, Black Sea and Macaronesian) some 60% of the assessments, or more, are unfavourable or unknown and did not change.

Figure 10: Changes in conservation status of habitats associated with grassland ecosystem by biogeographical region (% of number of assessments)

- ■ Favourable assessments
- ■ Improved assessments
- ■ Assessments which have deteriorated
- ■ Unfavourable and unknown assessments that did not change
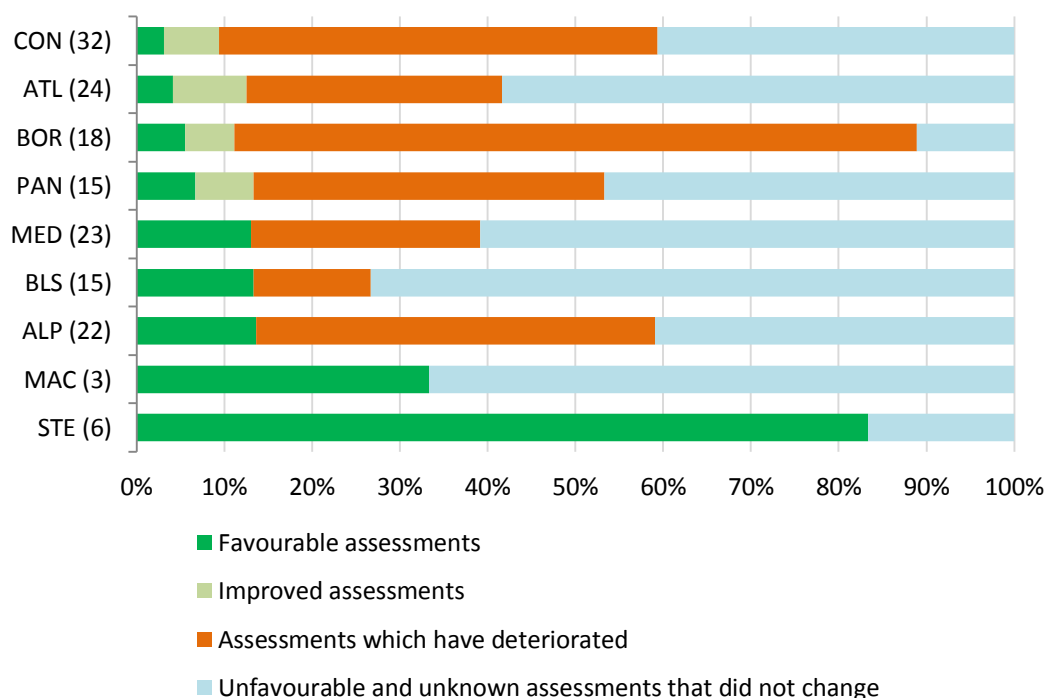
4.2.2 Non-bird species

As for the non-bird species related to agricultural ecosystems improved assessments seem to be spread across more regions (seven in total), however the percentages are quite low (in the range between 5 and 10%) (Figure 11).

Steppic region has no reported improving assessments and, at the same time, has the smallest share of favourable assessments. Black Sea region reported no improving assessments, but has the highest share of favourable assessments (close to 40%).

In conclusion, it seems that changes in the conservation status of habitats and species related to agricultural ecosystems (increase of both favourable and unfavourable assessments) between the two reporting periods are mostly an artefact, and are attributable to the drastic reduction of unknown assessments (i.e. better information) (EEA, 2015a).

Figure 11: Changes in conservation status of non-bird species associated with agricultural ecosystems (cropland and grassland) by biogeographical region (% of number of assessments)

- ■ Favourable assessments
- ■ Improved assessments
- ■ Assessments which have deteriorated
- ■ Unfavourable and unknown assessments that did not change
- ■ Assessments that became 'unknown'
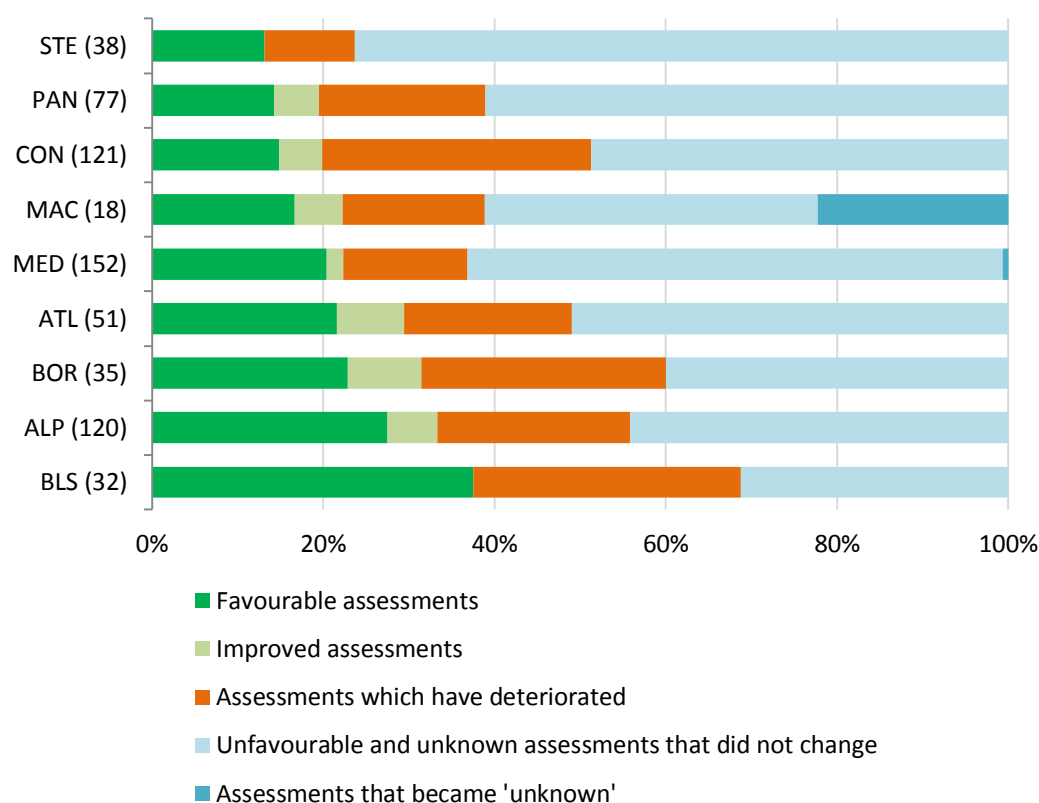
5 Pressures and threats

As part of the reporting for the nature directives Member States are required to indicate the key pressures and threats that influence the status and trends of individual species and habitat types. Pressures are defined as the factors acting now or during the reporting period (i.e. 6 years) to threaten the long-term viability of species, whereas threats are factors expected to be acting in the near future (i.e. 12 years into the future) (EEA, 2015a). In the reporting process pressures and threats are grouped into several hierarchical levels, with a generic first level of 17 categories and a detailed fourth level containing 112 categories. In the following paragraphs assessment on pressures and threats have been summed and in most cases represented for level 1 or 2 only.

5.1 Pressures and threats: overall results

5.1.1 Habitats

Grassland habitat types are most often affected by agriculture related pressures and threats (44% of the total reported Level 1 pressures/threats). When looking at the most frequently reported pressures / threats at level 2, it is clear that the top four are directly linked to changes in agricultural practices with grazing being reported most frequently (Figure 12). When examined in more detail, the main pressures/threats to grassland habitats are — in order of decreasing frequency — abandonment of pastoral systems, lack of grazing, lack of mowing, fertilisation, modification of cultivation practices and agricultural intensification.

Figure 12: Top 10 (% of frequency) reported high-ranked pressures and threats (at level 2) for habitats associated with grassland ecosystem
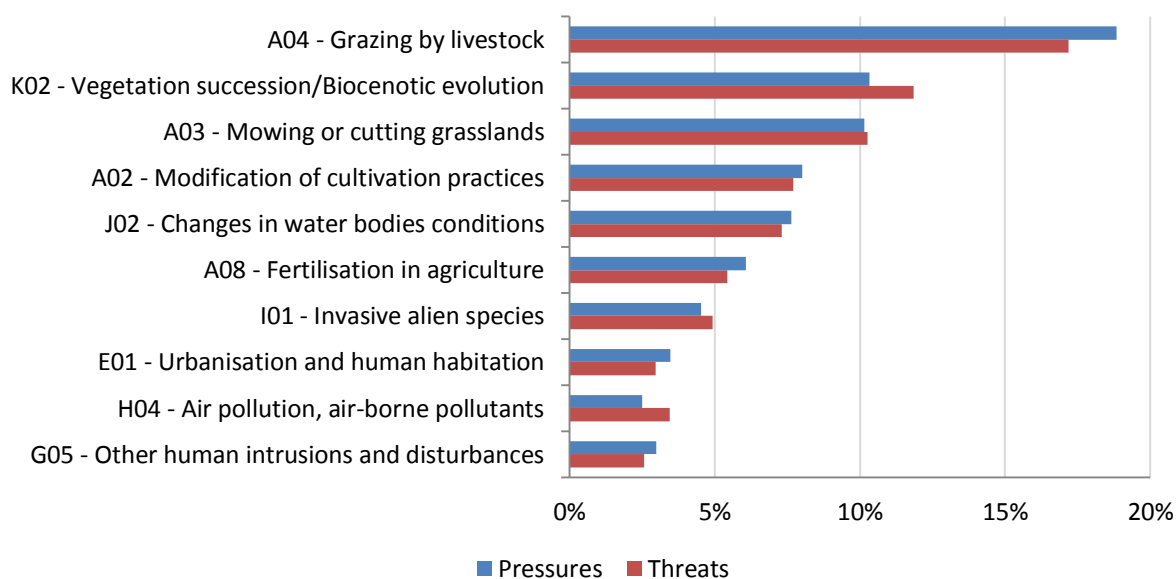
5.1.2 Non-bird species

Non-bird species associated with cropland and grassland are, as one would expect, most notably affected by the agriculture related threats/pressures (34% of the totally reported pressures/threats in both cases).

The main threats/pressures within this category for cropland species are the modification of cultivation practices and the use of 'pesticides' in agriculture. Other than these, human intrusions and disturbances; outdoor sports, leisure and recreational activities; as well as other urban/industrial developments play the largest roles overall (Figure 13).

For grassland species the most frequently reported pressures/threats are: grazing by livestock (particularly the abandonment of pastoral systems/lack of grazing) and modification of cultivation practices; vegetation succession/biocenotic evolution (especially regarding species composition change); and other changes to ecosystems (referring primarily to an anthropogenic reduction of habitat connectivity) respectively (Figure 13).

Figure 13: Top 10 (% of frequency) reported high-ranked pressures and threats (at level 2) for species associated with cropland and grassland ecosystems

Cropland ecosystem

Grassland ecosystem
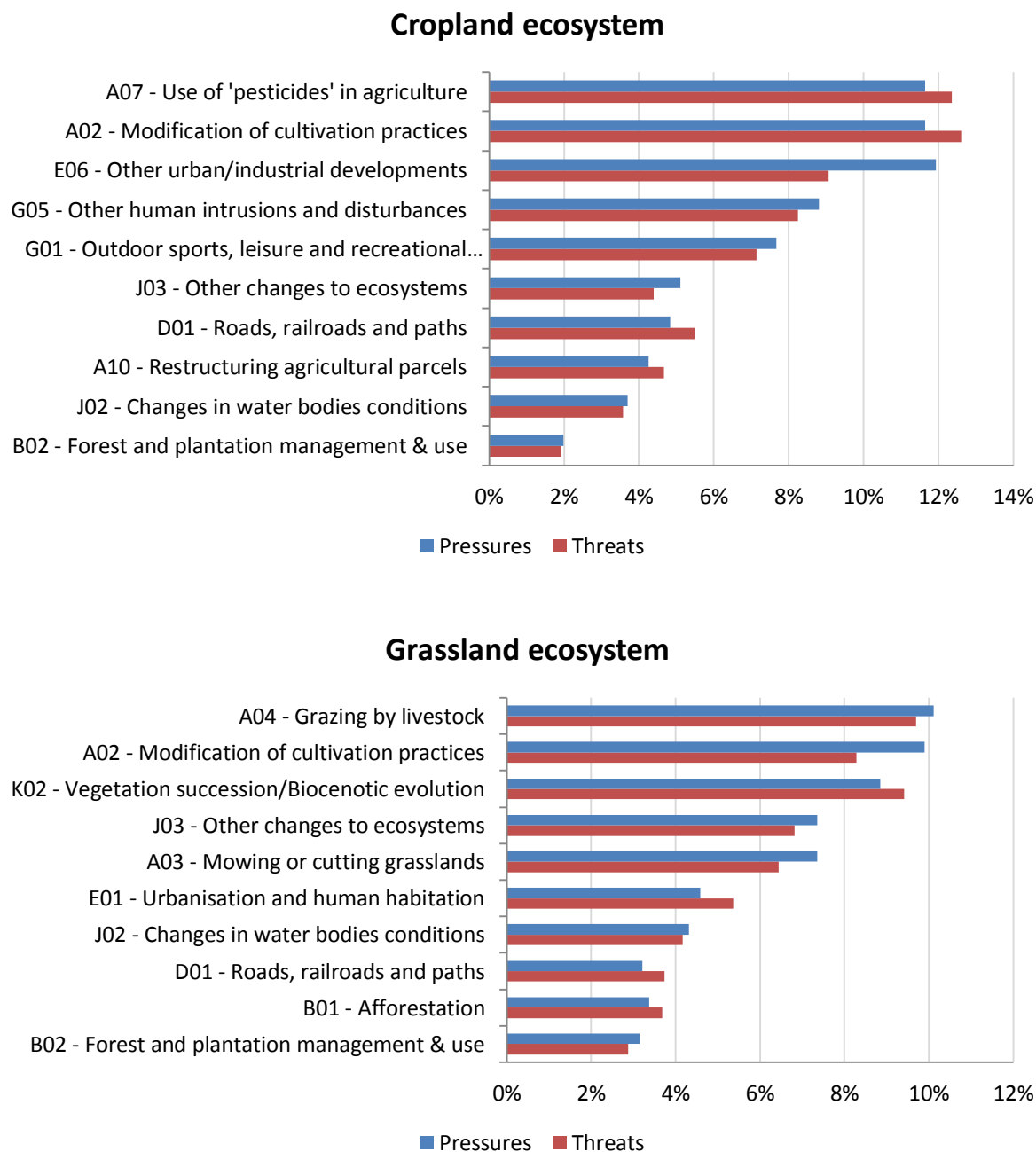
5.1.3   Bird species

Similarly to agriculture dependant habitats, the majority of pressures and threats for cropland birds are also attributed to 'agriculture' (54% of the total Level 2 reported pressures/threats). By far the most frequently reported pressure/threat is 'modification of cultivation practices' (listed in over a quarter of all reports). When looking into more details this is a result of agricultural intensification, grassland conversion into arable land and crop change. The rest of the top 10 ranked Level 2 pressures/threats are quite similar in reported frequencies around 5% (Figure 14).

Overall picture is almost identical for the grassland-related birds with agriculture related pressures/threats comprising 51% of the reported high-ranked Level 1 pressures/threats. Within this

category, the most dominant pressure/threat is the modification of cultivation practices (listed in more than a fifth of all reports) (Figure 14). When analysing the individual country reports in more details, this includes: agricultural intensification, grassland removal for arable land, and crop change. The following on the list — 'grazing by livestock' — can be predominantly attributed to the abandonment of pastoral systems/lack of grazing; 'other ecosystem modifications' is linked with the reduction or loss of specific habitat features; and 'hunting and collection of wild animals' refers largely to trapping/poisoning/poaching.

Figure 14: Top 10 (% of frequency) reported high-ranked pressures/threats (at level 2) for birds associated with cropland and grassland ecosystems

### Cropland ecosystem

Grassland ecosystem
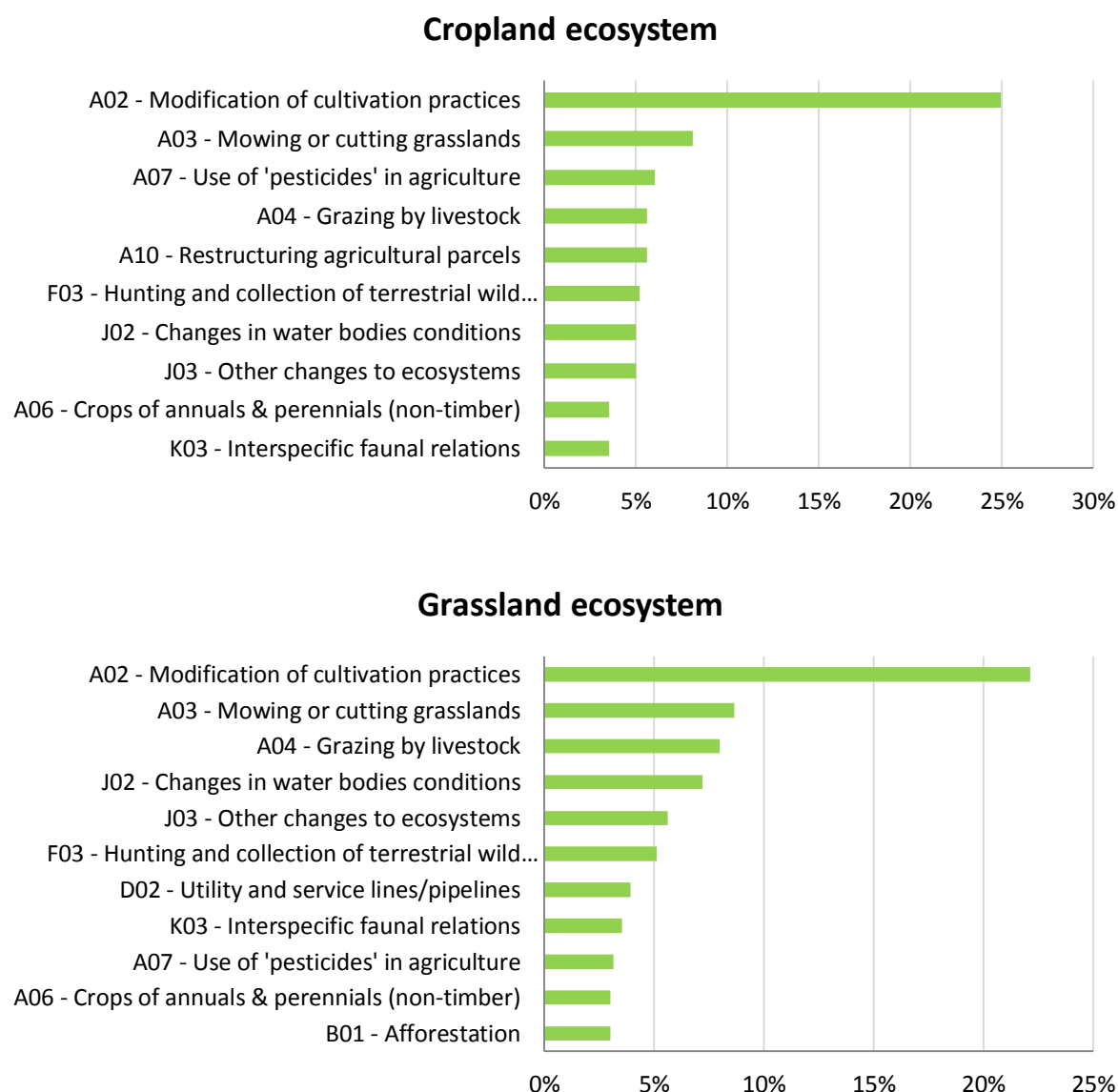
The relevance of impact agriculture has on bird species in general is best visible out of the fact that for all threatened and near threatened, declining or depleted bird taxa the most frequently reported high impact Level 2 pressures/threats were 'modification of cultivation practices'.

For illustration, the European little bustard (*Tetrax tetrax*) is struggling to maintain its population numbers. The main reason for its unfavourable state is the adoption of modern farming practices such as mechanised harvesting. Females and recently hatched chicks fall victim to farm machinery moving

at high speed and even at night. This selective pressure on the population leads to reproductive females becoming increasingly rare (EC, 2011b).

5.2 Pressures by biogeographical region

5.2.1 Habitats

It seems that the most important pressure to agricultural ecosystems across the EU is grazing by livestock, as this is the most frequently reported pressure in six out of nine biogeographical regions, while in the further two regions it comes on the second place (Table 6). This is to be expected as the habitat types classified as agricultural ecosystems are (natural and semi-natural) grasslands and grazing is the most common land-use linked to these habitat types.

Macaronesian is the only region where this pressure is not reported in the top three. The top three pressures reported in the Macaronesian region were to be expected due to the characteristics of the region – small isolated islands, remote from the European mainland. In such circumstances the two main pressures could be explained as a result of the isolation of the ecosystems – high impact of invasive alien species and interspecific floral relations. Concerns regarding the impacts of alien species on native vegetation on islands are well documented (Kiehn, M., 2011)

Pressures listed as the third most frequently reported — Mining and quarrying; Urbanisation and human habitation — are a direct consequence of the competition between satisfying human needs and allowing room for nature in the island environment where the available space is limited.

Table 6: Top three reported pressures (at level 2) to habitats associated with grassland ecosystem by biogeographical region

ALP	ATL	BLS	BOR	CON	MAC	MED	PAN	STE
Grazing by livestock	Grazing by livestock	Grazing by livestock	Grazing by livestock	Grazing by livestock	Invasive alien species	Grazing by livestock	Biocenotic evolution, succession	Changes in cultivation practices
Mowing or cutting grasslands	Biocenotic evolution, succession	Mining and quarrying	Mowing or cutting grasslands	Biocenotic evolution, succession	Interspecific floral relations	Urbanisation and human habitation	Grazing by livestock	Grazing by livestock
Changes in cultivation practices	Changes in water bodies conditions	Outdoor recreation; Changes in water bodies conditions	Biocenotic evolution, succession	Changes in cultivation practices	Mining and quarrying; Urbanisation and human habitation	Outdoor recreation	Invasive alien species	

*In some cases there are two pressures listed in the same field. This is due to the fact that they were reported with the same frequency.

5.2.2 Non-bird species

In terms of reported pressures to species preferring agricultural ecosystems there is more variation than by habitats. However, it can still be clearly concluded that the main pressure to these species are changes in cultivation practices (reported among the top three most frequent pressures in six out of nine regions) (Table 7).

However, changes in agricultural practices include both agricultural intensification and abandonment and both can have significant negative impacts on biodiversity. Situation varies per biogeographical

region but abandonment seems to be of a particular concern in Boreal region (reported in almost a quarter of all the reports), but it is also relatively frequently reported with high importance in Alpine and Continental regions (in about 10 % of reports of both regions) (EEA, 2015a). Agricultural abandonment is a well-documented trend in Western Europe. The commercialisation of agriculture, through technological developments, and the influence of CAP have increased productivity and focused agricultural activity on more fertile and accessible land thus transforming traditional approaches to farming. In many areas this has led to a decline in traditional labour intensive practices and marginal agricultural land is being abandoned. These trends, and the problems they create, are particularly marked in mountain areas (MacDonald et al., 2000). Environmental impacts of farmland abandonment can be viewed as the loss of an on-going process of land management and an associated threat to biodiversity. The small-scale and extensively managed farmlands that are common in mountain areas are particularly vulnerable to marginalisation and abandonment (Haddaway et al., 2013).

Table 7: Top three reported pressures (at level 2) to non-bird species associated with agricultural ecosystems by biogeographical region

ALP	ATL	BLS	BOR	CON	MAC	MED	PAN	STE
Grazing by livestock	Changes in cultivation practices	Urbanisation and human habitation	Biocenotic evolution, succession	Changes in cultivation practices	Other changes to ecosystems	Grazing by livestock	Changes in cultivation practices	Changes in cultivation practices
Mowing or cutting grasslands	Other changes to ecosystems	Changes in cultivation practices	Grazing by livestock	Biocenotic evolution, succession	Invasive alien species	Urbanisation and human habitation	Biocenotic evolution, succession	Urbanisation and human habitation
Changes in cultivation practices	Use of 'pesticides' in agriculture	Other changes to ecosystems	Other changes to ecosystems	Grazing by livestock	Interspecific floral relations	Other changes to ecosystems	Mowing or cutting grasslands	Use of 'pesticides' in agriculture

6 Natura 2000 coverage and conservation measures

6.1 Coverage of the ecosystem in Natura 2000

The proportion of agriculture dependant habitat types within Natura 2000 sites varies strongly among the Member States — from below 5 % in Latvia, Lithuania and Luxemburg to more than 25 % in Portugal, United Kingdom, Spain, Hungary and Italy. Across the EU-27 agriculture dependant habitat types represented about 20 % of the terrestrial part of the Sites of Community Importance (SCI) (according to data from December 2011) (Eurostat, 2012a).

In different EU countries, there is a variety of habitats which are dependent on different traditional management practices. For example, in the western part of the Iberian Peninsula the agricultural habitat types within the Natura 2000 sites are dominated by a mosaic of dry open habitats composed of heathland, *dehesas*, and pseudo-steppe. Many of these very biodiversity rich habitats depend on extensive grazing and occasional arable cultivation. *Dehesas*, for example, would be invaded by Cistus scrub and lose their vitality and diversity and be exposed to much higher fire risks without appropriate agricultural management. Italian Natura 2000 sites in the Apennines — in the central and southern areas of Italy — have a high proportion of semi-natural dry grasslands and pseudo-steppe. In Greece, phrygana — a typical sclerophyllous vegetation — is mainly present in the sites. Nearly all

these habitats have been created through extensive grazing with cattle, sheep and goats (Eurostat, 2012a).

When looking at the Special Protection Areas (SPA) designated under the Birds Directive, in Sweden, Spain, Italy and Hungary have the highest proportion of agriculture dependent habitats (between 24 and 31 %) (Eurostat, 2012a). This gives an indication of the distribution across Europe of habitats that require extensive farming practices within the sites dedicated to birds conservation. At the EU-27 level, Natura 2000 areas depend on a continuation of extensive farming practices, such as for example hay-making or extensive sheep grazing, cover some 11.5 % of the SPAs (Eurostat, 2012a).

The review of Species Action Plans carried out by BirdLife in 2011 shows that there has been significant progress with the inclusion of threatened birds' populations in Natura 2000. For the large majority of the species — not just those related to agriculture — Natura 2000 holds more than half or even 100% of their population at any given stage of their life cycle. For species which are still more common or are thinly dispersed over large areas inclusion in protected areas is lower. Their conservation must be therefore achieved through other means, such as agri-environmental schemes (EC, 2011b).

6.2   Conservation measures

6.2.1   Habitats

Agricultural habitat types can be found inside many Natura 2000 sites. Agricultural land use can continue within and around the sites as long as there are no activities damaging to the habitat types listed on the Annex I of the Habitats Directive. Many of the habitats in such areas actually depend on the continuation of traditional agricultural practices in order to remain in or achieve the favourable conservation status. In Hungary, most of the habitats that require extensive agricultural practices are salt steppes and marshes, hay and alluvial meadows, steppic grasslands and sand steppes. Bulgaria and Romania contain many extensive grasslands and meadows from mountain areas to coastal dunes, marshes and pseudo-steppes. Lowland hay meadows are well represented in Natura 2000 sites in several countries: Poland, France, Germany, Hungary, Czech Republic, Slovenia and Slovakia. From Poland up to Sweden, wet habitats linked to extensive agricultural practices, such as fens, mires and alluvial meadows are typical of this Baltic region. In Sweden, alpine and boreal heaths are also well represented. Natura 2000 sites located along the Atlantic coast from Denmark to Belgium as well as Ireland and the UK have high proportions of dry and wet heaths but also different types of coastal dune vegetation (Eurostat, 2012a).

General economic and technological trends require farms to increase production efficiency. This often leads to abandonment of traditional farming practices and/or agricultural intensification. So, the challenge in these farmland areas is to provide economic incentives and advice to landholders for a continuation of wildlife friendly farming practices. This can be achieved through agri-environmental schemes, rural development instruments and other measures including Natura 2000 payments.

Since its beginning, the Commission's environment and nature funding programme, LIFE, has been contributing to projects with actions targeting grassland ecosystems within the Natura 2000 network. LIFE focused especially on the link between agriculture and grasslands habitats. LIFE funds have played an important role as a catalyst for the establishment of site management plans. LIFE-funded projects have also supported the implementation of targeted agri-environment schemes with measures such as local set-aside payments for wetland buffer areas, working in co-operation with farmers and

agricultural authorities. Examples of such projects have been published in a LIFE publication: 'LIFE and Europe's grasslands: Restoring a forgotten habitat'[10] (EC, 2008).

Looking at the individual reports from the Member States the most frequently reported conservation measures for agriculture related habitats are related to maintenance of grasslands in almost a third of the reports, and establishment of protected sites in more than 20 % of the reports. Actually, three out of the top five reported conservation measures are policy oriented (Table 8).

Table 8: Top 5 level 2 conservation measures ranked high for habitats associated with grassland ecosystem

Measure	%
2.1 - Maintaining grasslands and other open habitats	30.9
6.1 - Establish protected areas/sites	21.8
6.3 - Legal protection of habitats and species	7.9
9.1 - Regulating/Management exploitation of natural resources on land	6.4
6.0 - Other spatial measures	5.1

6.2.2   Non-bird species

In the period 1992-2006 more than 370 projects directly or indirectly targeted grasslands habitats or species listed under the annexes of the Habitats and Birds Directives under the LIFE-Nature component of the LIFE programme. More specifically, from 1999 to 2006 LIFE co-funded more than 45 projects directly targeting grasslands habitats around Europe. The projects cover almost all grasslands habitats with a particular focus on calcareous and dry grasslands habitats (i.e. 6210* – Semi-natural dry grasslands (Festuco-Brometalia) (important orchid site); and 6220* – Pseudo-steppe with grasses and annuals of the Thero-Brachypodietea), which were targeted by two-thirds of the projects. Direct conservation actions supported by these projects include steps taken to re-establish traditional farmland activities that support grasslands habitats. These can include: elimination of trees, mowing, recovering degraded areas, habitat restoration, alien species eradication, establishment of fences and the reintroduction of grazing (EC, 2008).Non-bird species

Situation is very similar for the non-bird species with legal protection and establishment of protected areas being reported the most often (Table 9). The reported conservation measures are almost identical for species in grassland and cropland ecosystem, except for the addition of 'adapting of crop production' as a frequent measure in the cropland ecosystems.

---

[10] http://ec.europa.eu/environment/life/publications/lifepublications/lifefocus/documents/grassland.pdf

Table 9: Top 5 level 2 conservation measures ranked high for species associated with cropland and grassland ecosystems

Cropland ecosystems		Grassland ecosystems	
Measure	**%**	**Measure**	**%**
6.3 - Legal protection of habitats and species	28.4	6.3 - Legal protection of habitats and species	22.9
6.1 - Establish protected areas/sites	19.4	6.1 - Establish protected areas/sites	18.8
7.4 - Specific single species or species group management measures	9.7	2.1 - Maintaining grasslands and other open habitats	18.7
2.1 - Maintaining grasslands and other open habitats	7.1	7.4 - Specific single species or species group management measures	8.2
2.2 - Adapting crop production	5.8	9.1 - Regulating/Management exploitation of natural resources on land	4.8
9.1 - Regulating/Management exploitation of natural resources on land	5.8		

LIFE programme also had an important role in protecting grassland related non-bird species, especially invertebrates (butterflies and dragonflies). These insects play an extremely important role in grasslands and other ecosystems and are important actors in our economy. These projects include actions such as establishment of mechanisms for the legal protection of the species on Natura 2000 sites by the introduction of legally-binding management plans or the elaboration of national conservation or biodiversity plans; or on-site work on conservation, upgrading and restoration of habitats. Typically, the latter actions include mechanical clearing of overgrowth, including scrubs and trees, controlled burning, mowing, extensive grazing, and in some cases removal of upper peat layers and restoration of natural hydrology (EC, 2008).

6.2.3 Bird species

When analysing the most frequently reported conservation measures for birds these are almost identical for both cropland and grassland related species. The first two most frequently reported measures are policy related: establishment of protected areas and legal protection of habitats and species (in about one fifth of all reports). Maintenance of habitats is the third most often reported measure in close to 15 5 of the reports (Table 10).

Several LIFE projects directly target grasslands bird species, and the programme has been actively contributing to the conservation of these species and their habitats. Some of these species are: falcons and kestrels (*Falco naumanni*, *Falco vespertinus* and *Falco cherrug*); bustards (*Tetrax tetrax*, *Otis tarda* and *Chlamydotis undulata*); and corncrake (*Crex crex*) (EC, 2008).

One of important conservation tools for bird species in Europe proved to be European Bird Species Action Plans. The plans provide information about the status, ecology, threats of each species and describe the key actions that are required to improve their conservation status in Europe. In the period 2008-2010 six new such plans have been prepared and nine existing plans were revised. Among these are the little and great bustards (*Tetrax tetrax* and *Otis tarda*). Priority actions for these two species, among other, include: to ensure that agricultural practices are protecting chicks and nests, to maintain diverse habitats in the farmland, to ensure protection and management of breeding sites through agri-environmental measures (EC, 2011b).

Table 10: Top 5 level 2 conservation measures ranked high for birds associated with cropland and grassland ecosystems

Cropland ecosystems		Grassland ecosystems	
Measure	**%**	**Measure**	**%**
6.1 Establish protected areas/sites	22.5	6.1 Establish protected areas/sites	21.2
6.3 Legal protection of habitats and species	18.8	6.3 Legal protection of habitats and species	18.9
2.1 Maintaining grasslands and other open habitats	13.1	2.1 Maintaining grasslands and other open habitats	14.7
2.2 Adapting crop production	8.4	7.4 Specific single species or species group management measures	7.3
7.1 Regulation/Management of hunting and taking	8.0	2.2 Adapting crop production	6.6

References

Berg, Å., Wretenberg, J., Żmihorski, M., Hiron, M. and Pärt, T., 2015, 'Linking occurrence and changes in local abundance of farmland bird species to landscape composition and land-use changes', *Agriculture, Ecosystems & Environment* 204(0), pp. 1–7.

Deinet, S., Ieronymidou, C., McRae, L., Burfield, I.J., Foppen, R.P., Collen, B. and Böhm, M., 2013, *Wildlife comeback in Europe: The recovery of selected mammal and bird species*, Final report to Rewilding Europe by ZSL, BirdLife International and the EBCC, London, UK.

EBCC, 2012, 'European wild bird indicators, 2012 update', *EBCC - European Bird Census Council* (http://www.ebcc.info/indicators2012.html) accessed June 3, 2015.

EBCC, 2014, 'Trends of common birds in Europe, 2014 update', *EBCC - European Bird Census Council* (http://www.ebcc.info/index.php?ID=557) accessed June 23, 2015.

EC, 2008, *LIFE and Europe's grasslands: Restoring a forgotten habitat*, European Commission, Luxembourg: Publications Office of the European Union.

EC, 2011a, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee Of The Regions 'Our life insurance, our natural capital: an EU biodiversity strategy to 2020', COM(2011) 244 final of 3 May 2011

EC, 2011b, *Conservation and Recovery of Threatened Birds in the European Union*, European Commission, Luxembourg: Publications Office of the European Union.

EC, 2013a, *Mapping and Assessment of Ecosystems and their Services: An analytical framework for ecosystem assessment under Action 5 of the EU Biodiversity Strategy to 2020*, Technical Report, 2013 – 067,

EC, 2013b, *Overview of CAP Reform 2014-2020*, Agricultural Policy Perspectives Brief, N°5*, European Commission, Brussels, Belgium.

EC, 2014, *Mapping and Assessment of Ecosystems and their Services: Indicators for ecosystem assessments under Action 5 of the EU Biodiversity Strategy to 2020*, Technical Report, 2014 – 080,

EC, 2015, *The State of Nature in the European Union - Report on the status of and trends for habitat types and species covered by the Birds and Habitats Directives for the 2007-2012 period as required under Article 17 of the Habitats Directive and Article 12 of the Birds Directive*, REPORT FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT, European Commission, Brussels, Belgium.

EEA, 2010a, *EU 2010 Biodiversity Baseline*, 12, European Environment Agency, Copenhagen.

EEA, 2010b, *Europe's ecological backbone: recognising the true value of our mountains*, EEA Report, No 6/2010, European Environment Agency, Copenhagen, Denmark.

EEA, 2014a, 'Agricultural Areas in Europe', (http://www.eea.europa.eu/data-and-maps/explore-interactive-maps/agricultural-areas-in-europe).

EEA, 2014b, 'Estimated High Nature (HNV) presence in Europe', (http://www.eea.europa.eu/data-and-maps/figures/estimated-high-nature-hnv-presence).

EEA, 2014c, 'Final database on links between species/habitat-types and broad ecosystems version 2014', *available soon on EEA BDC*.

EEA, 2015a, *State of nature in the EU - Results from reporting under the nature directives 2007–2012*, Technical report No 2/2015, European Environment Agency, Copenhagen, Denmark.

EEA, 2015b, *Contribution to Target 2 Action 5 Mapping and Assessment of Ecosystems and their Services (MAES) of the EU Biodiversity Strategy to 2020*, Technical report, No 6/2015, European Environment Agency, Copenhagen, Denmark.

EEA, 2015c, *Agriculture*, SOER 2015 European briefings, European Environment Agency, Copenhagen, Denmark.

EEA, 2015d, 'Abundance and distribution of selected species (SEBI 001) - Assessment published Feb 2015', *European Environment Agency* (http://www.eea.europa.eu/data-and-maps/indicators/abundance-and-distribution-of-selected-species/abundance-and-distribution-of-selected-2) accessed June 4, 2015.

Eurostat, 2012a, 'Agri-environmental indicator - Natura 2000 agricultural areas', *eurostat Statistics Explained* (http://ec.europa.eu/eurostat/statistics-explained/index.php/Agri-environmental_indicator_-_Natura_2000_agricultural_areas) accessed June 16, 2015.

Eurostat, 2012b, 'Land cover, land use and landscape', *eurostat Statistics Explained* (http://ec.europa.eu/eurostat/statistics-explained/index.php/Land_cover,_land_use_and_landscape) accessed June 11, 2015.

Evans, D. and Arvela, M., 2011, *Assessment and reporting under Article 17 of the Habitats Directive: Explanatory Notes and Guidelines for the period 2007–2012*, European Topic Centre on Biological Diversity.

Haddaway, N., Styles, D. and Pullin, A., 2013, 'Environmental impacts of farm land abandonment in high altitude/mountain regions: a systematic map of the evidence', *Environmental Evidence* 2(1), pp. 18.

Halada, L'., Evans, D., Romaõ, C. and Petersen, J.E., 2011, 'Which habitats of European Importance depend on agricultural practices?', *Biodiversity and Conservation* 20, pp. 2365–2378.

IUCN, 2011, 'European Red List', (http://www.iucnredlist.org/initiatives/europe/european-red-list-site) accessed June 23, 2015.

Kiehn, M., 2011, 'Invasive alien species and islands', in: Bramwell, D. and Caujapé-Castells, J. (eds), *The Biology of Island Floras*, Cambridge University Press, Cambridge, pp. 536.

MacDonald, D., Crabtree, J. ., Wiesinger, G., Dax, T., Stamou, N., Fleury, P., Gutierrez Lazpita, J. and Gibon, A., 2000, 'Agricultural abandonment in mountain areas of Europe: Environmental consequences and policy response', *Journal of Environmental Management* 59(1), pp. 47–69.

MEA, 2005, *Ecosystems and Human Well-being: Current State and Trends, Volume 1*, Millenium Ecosystem Assessment, Island Press, Washington, Covelo, London.

Appendix 1: Habitats Directive Annex I habitat types associated with MAES grassland ecosystem (EEA, 2014c)

1330   Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

1340   Inland salt meadows

1410   Mediterranean salt meadows (*Juncetalia maritimi*)

1510   Mediterranean salt steppes (*Limonietalia*)

1530   Pannonic salt steppes and salt marshes

1630   Boreal Baltic coastal meadows

2120   Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes")

2130   Fixed coastal dunes with herbaceous vegetation ("grey dunes")

2220   Dunes with *Euphorbia terracina*

2230   *Malcolmietalia* dune grasslands

2240   *Brachypodietalia* dune grasslands with annuals

2330   Inland dunes with open *Corynephorus* and *Agrostis* grasslands

6110   Rupicolous calcareous or basophilic grasslands of the *Alysso-Sedion albi*

6120   Xeric sand calcareous grasslands

6130   Calaminarian grasslands of the *Violetalia calaminariae*

6140   Siliceous Pyrenean *Festuca eskia* grasslands

6150   Siliceous alpine and boreal grasslands

6160   Oro-Iberian *Festuca indigesta* grasslands

6170   Alpine and subalpine calcareous grasslands

6180   Macaronesian mesophile grasslands

6190   Rupicolous pannonic grasslands (*Stipo-Festucetalia pallentis*)

6210   Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites)

6220   Pseudo-steppe with grasses and annuals of the *Thero-Brachypodietea*

6230   Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)

6240   Sub-Pannonic steppic grasslands

6250   Pannonic loess steppic grasslands

6260   Pannonic sand steppes

6270   Fennoscandian lowland species-rich dry to mesic grasslands

6280   Nordic alvar and precambrian calcareous flatrocks

6310   Dehesas with evergreen *Quercus* spp.

6410   *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)

6420   Mediterranean tall humid grasslands of the *Molinio-Holoschoenion*

6430   Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels

6440   Alluvial meadows of river valleys of the *Cnidion dubii*

6450   Northern boreal alluvial meadows

6460   Peat grasslands of Troodos

6510   Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*)

6520   Mountain hay meadows

6530   Fennoscandian wooded meadows

9070   Fennoscandian wooded pastures

21A0   Machairs (* in Ireland)

62A0   Eastern sub-Mediterranean dry grasslands (*Scorzoneratalia villosae*)

62B0   Serpentinophilous grassland of Cyprus

62C0   Ponto-Sarmatic steppes

62D0   Oro-Moesian acidophilous grasslands