Indicator Report 2019
of the Federal Government
under the
National Strategy
on Biological Diversity

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1 Introduction

Biodiversity is essential to human survival and wellbeing. As well as species diversity of plants, animals, fungi and microorganisms, biodiversity also includes habitat diversity and genetic diversity. Conserving biodiversity by protection and sustainable use secures the long-term needs of current and future generations. Alongside climate protection, biodiversity conservation is one of the greatest challenges of our time. At the United Nations Conference on Environment and Development (UNCED) in 1992, the world community adopted the UN Convention on Biological Diversity (CBD) to take global action on the dramatic loss of species, habitats and genetic diversity. Germany emphatically supports the objectives of the CBD both internationally and nationally, and the Federal Cabinet adopted the National Strategy on Biological Diversity in 2007 (BMU 2007).

In the National Strategy on Biological Diversity, the German Federal Government sets itself ambitious goals for the conservation and enhancement of biodiversity and its sustainable use. Whether measures to attain such goals are implemented and whether the goals are actually attained calls for ongoing monitoring and assessment. For this purpose, data on issues such as the status of biodiversity and pressures on species and habitats is collated by means of long-term monitoring programmes and using standardised methods. The results can be presented in the form of indicators.

The National Strategy on Biological Diversity provides for a summary analysis of success using indicators. When it first was adopted in 2007, it contained an initial indicator set for use in future reporting (BMU 2007). The indicators under the National Strategy on Biological Diversity are linked to the visions and action areas set out in the Strategy. They provide summary information about the status of and trends in biodiversity in Germany. The indicators also trace pressures on biodiversity and the action taken so far to ensure its conservation and sustainable use. Progress and areas for further action are highlighted for use in shaping nature conservation policy and other policy areas relevant to biodiversity conservation.

The indicator set also serves the purpose of public information. The indicators are described in-depth on a German-language website (www.biologischevielfalt.de) published by the Federal Agency for Nature Conservation (BfN). The website also contains a wide range of information concerning implementation of the National Strategy on Biological Diversity.

The German National Strategy on Biological Diversity combines a vision for the future with some 330 qualitative and quantitative targets relating that vision to a wide range of biodiversity topics.

Based on those targets, the Strategy sets out roughly 430 measures in 16 action areas for implementation by state and non-state actors. Germany thus has a sophisticated, cross-sectoral national strategy for the Convention on Biological Diversity. Implementation of the National Strategy on Biological Diversity is aided by a broad-based political and social process involving governmental and non-governmental players. A large variety of measures, from agri-environmental and climate measures to contract-based nature conservation, promote the conservation and sustainable use of natural and cultural landscapes, species diversity, and plant and animal genetic resources, including wild populations. This implementation process requires science-based, transparent progress and success monitoring while making allowance for the fact that many measures will not show progress until the medium to longer term.

The initial indicator set contained in the National Strategy on Biological Diversity has been added to and enhanced in the intervening years. In the 2010 and 2014 indicator reports, the indicators available in each case were fully documented and assessed using a standardised format (BMU 2010, BMUB 2015). The indicators were also used as a basis in evaluating the status of implementation of the National Strategy on Biological Diversity in the 2013 and 2017 Progress Reports (Rechenschaftsberichte) (BMU 2013, BMUB 2017).

Compared with the 2014 report, the indicator set has been modified as follows for this Indicator Report 2019:

- The ‘Endangered species’ indicator includes the Red Lists published in 2016 (Invertebrates (Part 2) and Fungi (Part 1) – Macrofungi) in the calculation.
- The data used for the ‘Invasive species’ indicator is the list contained in the new EU Regulation 1143/2014 on Invasive Alien Species, which entered into force in 2016 and is legally binding for Germany:
  - The first sub-indicator records the absolute number of species in Germany that are in the early phase of invasion and are not yet considered established.
  - The second sub-indicator takes in the absolute number of species classified as widespread after 2010.
- The previous ‘Exceedance of critical loads for nitrogen’ indicator has been replaced by the ‘Eutrophication of ecosystems’ indicator from the current set of indicators contained in the German Sustainability Strategy.
- The ‘Genetic engineering in agriculture’ indicator will no long be used, as cultivation of genetically modified plants has not occurred in Germany since 2012.

The United Nations declared the years 2011-2020 the UN Decade on Biodiversity. The UN Decade features a wide range of activities and programmes to make more people alert to the need to conserve biodiversity. The idea is to heighten public awareness of the value of biodiversity and to promote social responsibility for its conservation and sustainable use. An aim of the United Nations Decade on Biodiversity is for governmental and non-governmental stakeholders to join forces in conserving biodiversity for the future. Over the course of the UN Decade, an assessment at both international and national level will be made as to the status of biodiversity conservation. The Indicator Report 2019 to the National Strategy on Biological Diversity contributes by presenting key trends for Germany and assessing where Germany stands on the way to halting biodiversity loss.

[Margin column: The indicators under the National Strategy on Biological Diversity provide summary information about the status of and trends in biodiversity in Germany. They trace pressures on biodiversity and efforts towards its conservation and sustainable use. Progress and areas for further action are highlighted for use in shaping nature conservation policy and other policy areas relevant to biodiversity conservation.]

2 Indicator set for the National Strategy on Biological Diversity

The current 18 indicators in the National Strategy on Biological Diversity are arranged under five main headings:

- Components of biological diversity (7 indicators)
- Settlement and transport (2 indicators)
- Economic activities (7 indicators)
- Climate change (1 indicator)
- Public awareness (1 indicator)

In the following, these 18 indicators are assessed and interpreted on the basis of data as of June 2019. Their presentation follows a uniform format. In each case, it is shown how the indicators relate to the vision (Chapter B) and action areas (Chapter C) set out in the National Strategy on Biological Diversity.

The indicator names in the section headings express the subject matter of the indicators as concisely as possible. An introductory passage explains how each indicator relates to the conservation and sustainable use of biodiversity. A section with the subheading ‘Indicator’ defines the indicator concerned and states the relevant target in the National Strategy on Biological Diversity. The ‘Composition’ section gives information on data sources and briefly shows how the indicator is compiled and calculated. Changes in indicator values are interpreted in the section with the subheading ‘Assessment’. Recommendations for action are also given here.

All indicators are provided with a target in the form of a general quality target or quantitative target values. Where there are quantitative targets, it is possible to give a target attainment status. This is determined by measuring the distance between the last data point and the target value and assigning it to one of four classes. The status classes are illustrated using four symbols. The class boundaries for the target attainment status are as follows:

++	Zielerreichungsgrad ≥ 90 %	Der aktuelle Wert liegt innerhalb des Zielbereiches.
+	Zielerreichungsgrad 80 % bis < 90 %	Der aktuelle Wert liegt in der Nähe des Zielbereiches.
-	Zielerreichungsgrad 50 % bis < 80 %	Der aktuelle Wert liegt noch weit vom Zielbereich entfernt.
--	Zielerreichungsgrad < 50 %	Der aktuelle Wert liegt noch sehr weit vom Zielbereich entfernt.

Trend information is also provided to the extent that suitable data is available. The trend is determined using a common statistical measure (Spearman's rank correlation coefficient) from the last 11 data points, thus corresponding – for example – to a 10-year period. This does not include the indicator "Length of the vegetation period" (trend calculation over the entire time series from 1951 to 2017 with 67 data points). The results are classified as follows:

	Statistisch signifikanter Trend hin zum Ziel bzw. Zielwert
	Kein statistisch signifikanter Trend feststellbar (keine Signifikanz für ansteigenden oder abfallenden Trend)
	Statistisch signifikanter Trend weg vom Ziel bzw. Zielwert

No trend information can be provided if, for example, there are too few data points or if data points over the time series are not fully comparable.

Changes in indicators and any sub-indicators are shown in standardised charts. The target lines shown in the charts are intended as a guide for easier reading of the target values. They provide no information as to when the respective target values apply. Such information can be found in the texts in the section under the subheading 'Indicator'.

Beneath the charts, key information about each indicator is given in summary form, comprising references to thematic areas in the National Strategy on Biological Diversity, the definition of the indicator, a quantitative or general qualitative target, and the core assessment.

Background information and quotations – mainly from the National Strategy on Biological Diversity – are printed in the margin and supplement the textual information on each indicator.

At the end of the Report, the individual assessments for all 18 indicators under the National Strategy on Biological Diversity are combined into an overall assessment and presented in a summary table. The Report ends with a list of references for further reading.

2.1 Components of biological diversity

2.1.1. Species diversity and landscape quality

A rich diversity of plant and animal species is essential to the balance of nature and to human health and survival. Species diversity is closely bound up with diversity in habitats and landscapes. Conservation of both species diversity and the diversity of biotic communities and habitats is thus a central objective of the Federal Nature Conservation Act. In Germany, the natural environment has been shaped by centuries of land use, creating species-rich cultural landscapes. Conserving the biodiversity that has naturally arisen in this way requires more than simply protecting species and habitats in specific areas. It also requires sustainable forms of land use in the entire landscape, a reduction in emissions and responsible treatment of the natural environment.

So that the condition of the natural environment under the varied influence of land use can be assessed in summary form for Germany as a whole, an indicator has been developed based on population changes in selected bird species representative of the country's primary landscape and habitat types. The sizes of bird populations (by number of territories or breeding pairs) indicate the suitability of a landscape as a habitat for the selected bird species. Birds are not the only type of fauna that depend on a richly structured landscape with intact habitats under sustainable management. The indicator therefore also indirectly reflects trends in many other countryside species and in the sustainability of land use.

The 'Species diversity and landscape quality' indicator was developed as a key sustainability indicator under the National Sustainability Strategy (BUNDESREGIERUNG 2002) and incorporated in the National Strategy on Biological Diversity. It is thus also regularly reported in the indicator reports published under the National Sustainability Strategy, most recently in the Indicator Report 2018 (STATISTISCHES BUNDESAMT 2018).

[Margin column: The indicator provides information about species diversity, landscape quality and the sustainability of land use.]

Indicator

The indicator provides information about trends in species diversity, landscape quality and the sustainability of land use. It combines, in a single measurement, data on nationwide population sizes for selected, representative bird species in the country's primary landscape and habitat types.

For target-setting purposes, in 2003 an expert panel determined for each bird species the population size they believed attainable – originally by 2015 – if EU and national law on nature conservation and the principles of sustainable development were to be implemented without delay. The targets for each indicator species were determined as a multiple of the population sizes known at the time. The resulting index values were subsequently standardised to 100 percent, resulting in target values of 100 percent for each of the sub-indicators as well as for the aggregate indicator. In 2016, the target values were initially transferred unchanged to 2030 in the new edition of the German Sustainability Strategy and with the caveat that the target values for the sub-indicators and the aggregate indicator should be reviewed by 2020. The review of the target values is being carried out as part of a research and development project which was only able to start on 1 December 2019.

Composition

The indicator is compiled based on population trends in currently 51 bird species representative of Germany's primary landscape and habitat types (sub-indicators on farmland, forests, settlements, inland waters as well as coasts and seas). Reporting of a sub-indicator for the Alps was temporarily suspended because the available data was not sufficiently reliable. In consultation with state-run ornithological stations in the German Länder (states) and the Federation of German Avifaunists (DDA), ten representative bird species (eleven for forests) were selected as indicator species. Based on data from bird monitoring programmes – including counts of breeding pairs in sample plots distributed throughout Germany – the Federation of German Avifaunists (DDA), in cooperation with the Federal Agency for Nature Conservation (BfN), calculates the nationwide population size for each species every year. This is set in relation to the size of the species-specific target value, resulting in an annual target achievement rate expressed as a percentage. Monitoring of common breeding birds, which began in 2004 and is spatially representative and statistically reliable, was included in the calculation of the indicator. For this purpose, about 1,500 sample plots were processed in 2015.

For each sub-indicator, the arithmetic mean is calculated from the target attainment percentages for all ten or eleven bird species. These average figures allow the status of the primary habitat or landscape types to be assessed separately. The aggregate indicator is the weighted average of the sub-indicators. The weightings correspond to the area covered by each primary habitat or landscape type as a fraction of the total area of Germany. As in the 2014 indicator report, reporting of a sub-indicator for the Alps was temporarily suspended because the available data was not sufficiently reliable. The information on the aggregate indicator thus relates to Germany excluding the Alps. The data series was retroactively recalculated for this purpose. In the future, the underlying

data for the suspended sub-indicator is to be improved by increasing the number of sample plots. The historical figures for 1970 and 1975 are reconstructed. Figures for some bird species of inland waters and coasts and seas have been extrapolated for certain years.

Primary habitat/ landscape type	Weighting	Selected representative bird species
Farmland	0.52	Whinchat, Skylark, Yellowhammer, Corn Bunting, Woodlark, Northern Lapwing, Red-backed Shrike, Red Kite, Little Owl, Black-tailed Godwit
Forests	0.28	Grey-headed Woodpecker, Nuthatch, Lesser Spotted Woodpecker, Middle Spotted Woodpecker, Lesser Spotted Eagle, Black Woodpecker, Black Stork, Marsh Tit, Coal Tit, Wood Warbler, Willow Tit
Settlements	0.11	Jackdaw, Common Redstart, European Serin, Green Woodpecker, Black Redstart, House Sparrow, Common Swift, House Martin, Barn Swallow, Wryneck
Inland waters	0.06	Kingfisher, Common Sandpiper, Great Crested Grebe, Red-crested Pochard, Great Bittern, Marsh Harrier, White-tailed Eagle, Reed Warbler, Water Rail, Little Grebe
Coasts and sea	0.03	Oystercatcher, Common Eider, Common Tern, Hen Harrier, Arctic Tern, Red-breasted Merganser, Common Redshank, Ringed Plover, Common Guillemot, Little Tern
Alps	Suspended	---

Assessment

The species diversity and landscape quality indicator for 1990 was significantly below the reconstructed figures for 1970 and 1975. This reflects population crashes in many indicator species associated with farmland, human settlements and inland waters in the years prior to 1990. In contrast, the sub-indicators for forests, coasts and sea remained stable during the same period.

In the past ten reporting years (2005 to 2015), the indicator has not deteriorated further. No statistically significant trend in the aggregate indicator was detected for the period in question. However, in 2015 the indicator value was still far from the target range, at 70 percent of the target value. If the trend continues unchanged, the target for the aggregate indicator cannot be achieved by 2030. The sub-indicator for farmland has a decisive influence on the aggregate indicator. In 2015, it reached only 59 percent of the target value and has deteriorated statistically significantly over the past ten years. Also, the coasts and sea sub-indicator (which also stood at 59 percent of the target value in 2015) has likewise moved statistically significantly away from the target over the past ten years. The sub-indicators for inland waters and settlements each rose in 2015, to 75 and 73 percent

of the target respectively, but were still far from the target range. The forest sub-indicator showed the most favourable trend. In 2015, it reached the target range at 90 percent of the target value and showed a statistically significant positive trend. With the exception of the sub-indicators for forests and inland waters, all sub-indicators remained significantly below the comparative values for 1990.

In agricultural landscapes, most of the indicator bird species that breed in fields, meadows and pastures are still declining in numbers – with regional differences – due to intensive farming. It remains unclear whether the agri-environmental and nature conservation measures that have been introduced will lead to a reversal of the negative trend in the **farmland** sub-indicator in the medium and longer term. In addition to these measures, sustainable land-use is of utmost importance.

In **forests**, near-natural forest management has contributed to the high degree of target achievement and supported the return to a statistically significant positive trend (as last seen in the period 1997 to 2007). To maintain this trend and to ensure a high level of biodiversity and landscape quality in forests over the longer term, strict continuation of near-natural silviculture and continued consideration of nature conservation aspects in forest management are required. In addition, state funding schemes (e.g. forest environmental measures) must be further extended and widely used.

Human **settlements** host species that nest in and around buildings and species that depend on fallow land, orchards and farming structures in villages and on settlement fringes. Despite the positive trend, the population situation for these species is still far from the target range. The main reasons are the increasing amount of land sealed under impervious surfaces and the loss of near-natural habitats and village structures.

The indicator trend for **inland waters** has shown considerable fluctuations over the past few years, but is now moving towards the target range in a statistically significant way. However, as the populations of the indicator species are still far from the target range, measures for the renaturation of rivers and floodplains, which are to be stepped up in the implementation of the Water Framework Directive, play a key role in the future development of these habitats. And to ensure high levels of biodiversity, nutrient loads must be further reduced in a wide range of waterbodies.

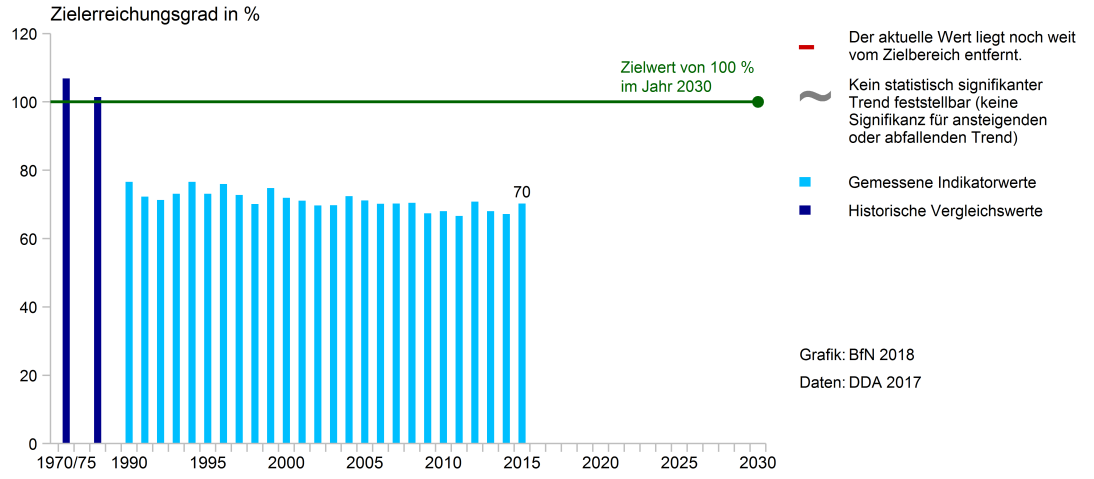
The negative trend for **coasts and sea** mainly affects breeding populations of beach and sand dune species, and also grassland species. In the ten years up to 2015, considerablepopulation decline has been seen in species such as Oystercatcher, Ringed Plover and Arctic Tern. The coastal conservation measures implemented have not yet reversed this trend and should be stepped up as a result.

The currently 51 bird species covered by the indicator include seven long-distance migrants that primarily winter in sub-Saharan Africa. With these species, the number of birds returning to Germany at the end of the winter depends on conditions in their winter quarters and along their migration routes. Among the populations in Germany, in the past ten years five of these species showed an increasing or neutral trend and two showed a slightly downward trend. Although this tends to have a positive impact on the indicator and certain sub-indicators, there is a general need for greater European and international cooperation on the conservation of migratory bird species. In particular, regulations are needed to significantly reduce hunting and catching in wintering areas and along migration routes, and to conserve the habitats of these species in Africa and elsewhere.

Conclusion

The main causes of species diversity and landscape quality loss are – to regionally varying degrees – intensive farming, landscape dissection and urban sprawl, soil sealing and pollutants affecting large areas (e.g. acidifying chemicals and nutrients). In human settlements, negative impacts are brought about by the loss of near-natural habitats and village structures due to building and soil sealing. Threats to coastal habitats include disturbance from increased recreational use and from construction, for example of coastal defences and wind turbines. To attain a positive trend in the aggregate indicator and all sub-indicators (or to accelerate the positive trend in the case of the forests sub-indicator), significant additional effort is needed, ideally in all relevant policy areas, at national, Länder (state) and municipal level. Such effort should focus in particular on farmland and on coasts and seas.

Artenvielfalt und Landschaftsqualität



Thematic areas

Almost all thematic areas, notably C 1 System of interlinked biotopes and networks of protected areas, C 6 Agriculture and silviculture, and C 12 Rural regions and regional development

Definition

Index (percentage index) of population sizes throughout Germany of selected representative bird species in primary habitat and landscape types

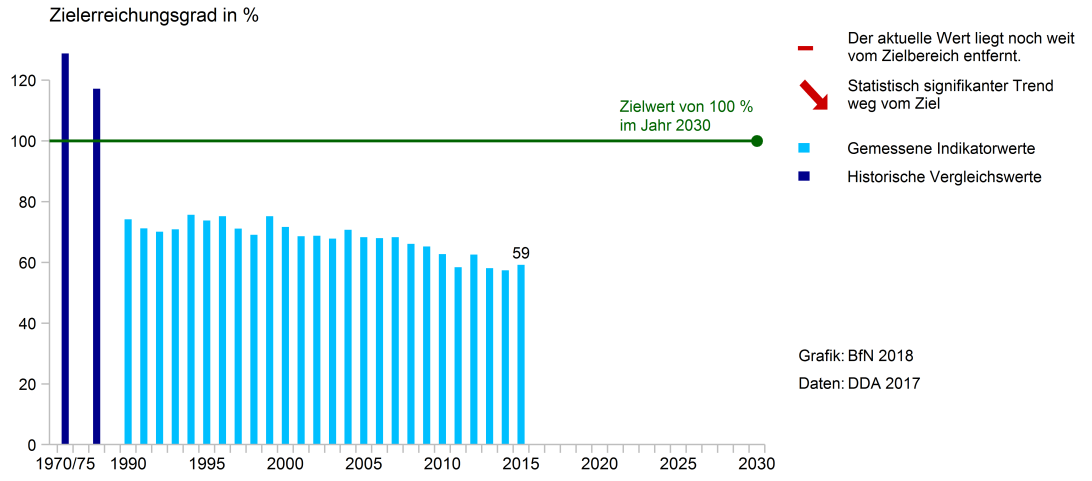
Target

The target values for the sub-indicators and the aggregate indicator of 100 percent each, which originally applied for 2015, were initially carried forward unchanged to 2030 in the new edition of the National Sustainability Strategy in 2016. These target values are being reviewed as part of an ongoing research and development project.

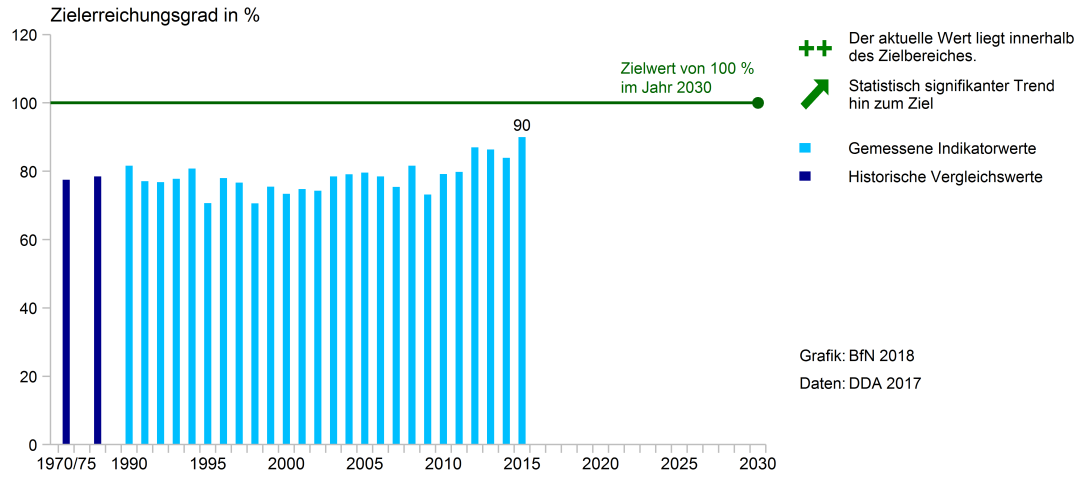
Core assessment

In the past ten reporting years (2005 to 2015), the indicator has not deteriorated further. No statistically significant trend in the aggregate indicator was detected for the period in question. However, the aggregate indicator value and the values for the sub-indicators – with the exception of the forests sub-indicator – are still far from the target range. If the trend continues unchanged, the target of 100 percent in 2030 cannot be attained without considerable additional effort, ideally in all relevant policy areas, at national, Länder (state) and municipal level.

Artenvielfalt und Landschaftsqualität - Agrarland



Artenvielfalt und Landschaftsqualität - Wälder



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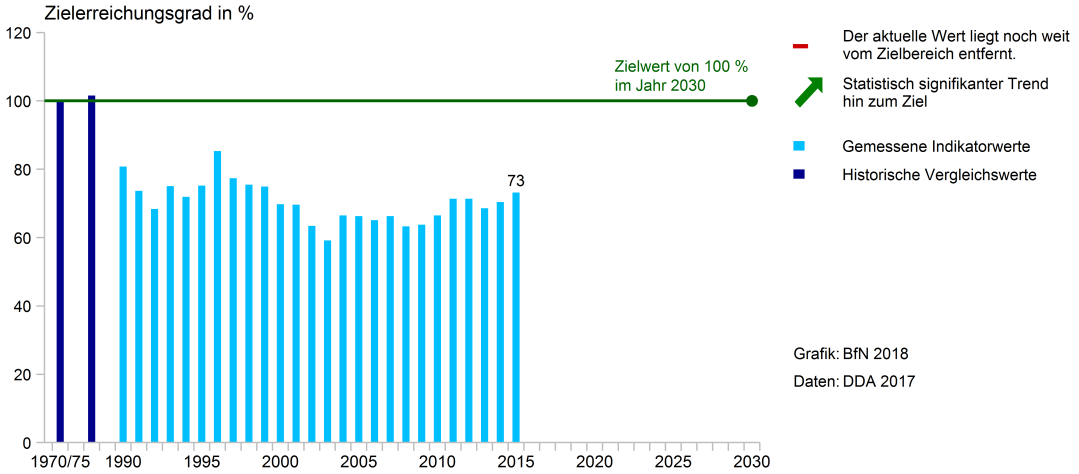
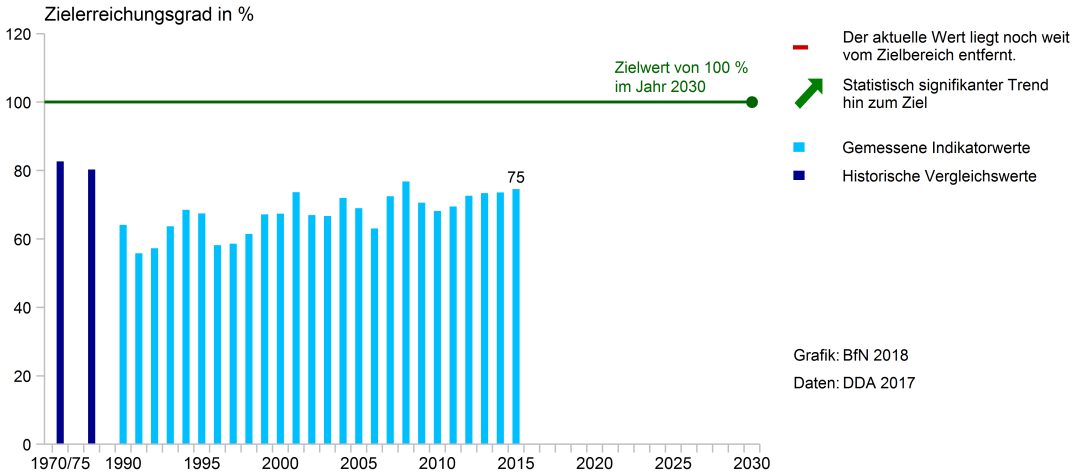
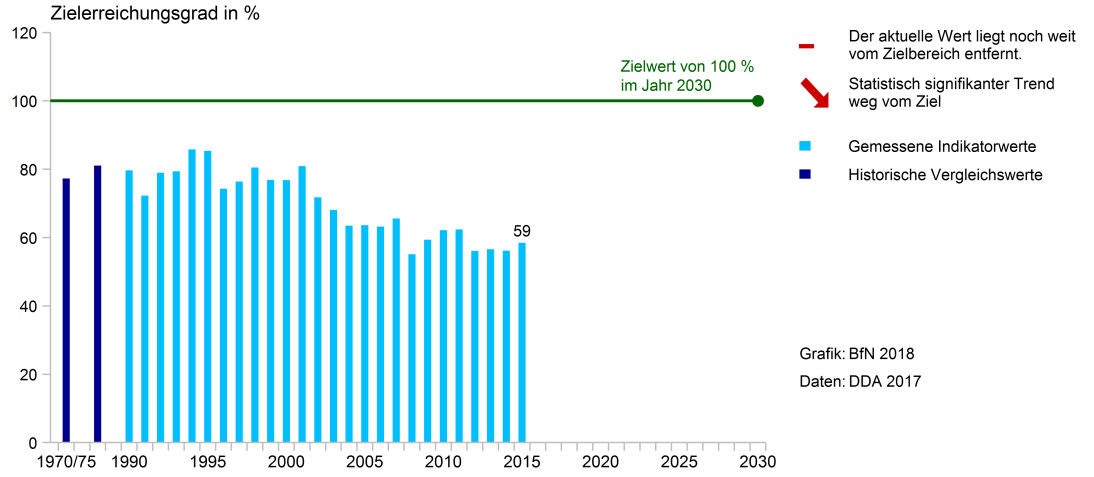


Artenvielfalt und Landschaftsqualität - Binnengewässer



Artenvielfalt und Landschaftsqualität - Küsten und Meere



2.1.2. Endangered species

The National Strategy on Biological Diversity aims to halt the decline in biodiversity and reduce the threat to species. In Germany, species protection is a key action area in nature conservation which continues to be of great importance and topicality. It is the subject of provisions under international law and regulations at EU and national level. The German national Red Lists contain key information on the threatened status for each of the approximately 30,000 species assessed and are updated every 10 years on average. Since they were first published nearly 40 years ago, the lists have become increasingly important as a medium of record for species conservation. Today, they are widely known, versatile conservation tools. The endangered species indicator provides an at-a-glance measure of species endangerment in Germany based on the assessments contained in the Red Lists.

[Margin column: The indicator assesses the degree to which species in selected species groups are endangered.]

Indicator

The indicator combines data on species endangerment from the German national Red Lists in a single measurement. The underlying data comprises the assessments of species in Red List categories, these being a set of threat levels ranging from least concern to extinction. The index provides a percentage figure representing the threat status of all those Red List species covered by the indicator.

With a view to sustaining species diversity, the National Strategy on Biological Diversity sets a target of improving the status of most Red List species by one category level of endangerment by 2020. Using this target, a concrete target value of 11 percent for the year 2020 can be calculated based on the classification of all species assessed. The target assumes a one-level improvement in the status of all currently endangered species. These comprise species in the categories 1 (critically endangered), 2 (endangered), 3 (vulnerable) and G (indeterminate).

[Margin column: "By 2020, the threat situation will have improved by one level for most of the species on the Red List." (BMU 2007: 27)]

Composition

The underlying data for the indicator comes from the German national Red Lists, which are compiled by panels of experts and are revised every 10 years on average. The lists currently available for use in compiling the indicator are the 1996 Red List of Plants and Fungi (LUDWIG & SCHNITTLER

1996) und the 1998 Red List of Animals (BINOT et al. 1998) along with the current editions of the German Red Lists published since 2009: HAUPT et al. 2009, LUDWIG & MATZKE-HAJEK 2011, BINOT-HAFKE et al. 2011, BECKER et al. 2013, GRUTTKE et al. 2016 und MATZKE-HAJEK et al. 2016. For the time being, the indicator is only assessed for the groups of vertebrates, lichens in the narrower sense, slime moulds, large marine algae, macrofungi and for 38 groups of invertebrates for which updated data on endangerment is available at national level. It covers an additional 11 species groups compared to the previously published indicator report to the National Strategy on Biological Diversity, as it has been supplemented by the two Red Lists published in 2016 (Invertebrates (Part 2) and Fungi (Part 1) – Macrofungi). Given the expanded statistical population, the target value, which depends on the number of species accounted for and their endangerment, was also recalculated. The Federal Agency for Nature Conservation (BfN) plans to issue updated nationwide Red Lists for further species groups and to continue conducting regular updates. In the future, indicator assessment will also include data from these Red Lists.

When calculating the indicator, species are included with different weighting factors relative to their endangerment. The more severely endangered a species, the greater the extent to which it affects the indicator value. The compiled index results in a scale on which zero percent would be attained if no species were endangered or extinct in the wild. At 100 percent, all assessed species would be extinct in the wild.

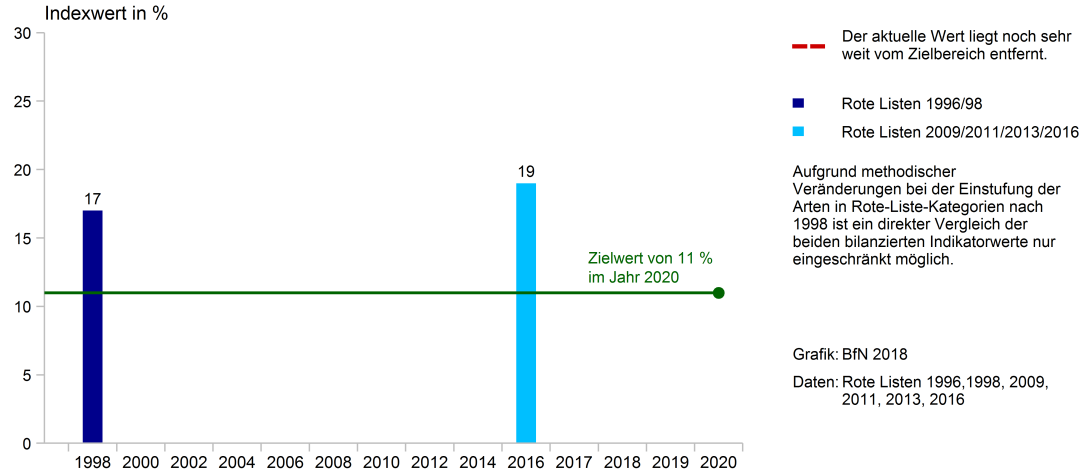
Assessment

For 2016, the indicator value provisionally calculated solely for the groups of vertebrates, lichens in the narrower sense, slime moulds, large marine algae, macrofungi and for 38 groups of invertebrates amounts to 19 percent. If the threat to species lessens in the future, this figure will decrease. The current indicator value is still far removed from the 11 percent target. To reach the target value, the threat status would have to be reduced by one level for 4,419 of the 13,908 species currently accounted for, with no worsening of the threat status for the remaining species.

Compared with the relevant Red Lists from 1996/1998, a trend towards deterioration is evident for 2016. Due to methodological changes in the assignment of species to the Red List categories since 1998, comparability of the two indicator values is limited. With regard to the assessment, it should be noted that the vertebrates included account for substantially less than 19 percent of all animal, plant and fungus species found in Germany. This limits the ability to generalise and apply the indicator values shown here to the entire diversity of species in Germany and their threat status. As more up-to-date Red Lists are published, a far larger number of species will be included in the index and the conclusions drawn from the indicator assessment could well change.

For the species groups currently included, major species conservation efforts are needed to attain the 11 percent target by 2020 (as of 2016). Targeted measures must be taken to ensure the survival of severely endangered species. Priority treatment should thus be given to endangered species for whose conservation Germany has a high or especially high degree of responsibility. For species conservation to be successful, it is also necessary to improve knowledge about all species occurring in Germany and their threat status.

Gefährdete Arten



For the time being, the indicator is only assessed for the groups of vertebrates, lichens in the narrower sense, slime moulds, large marine algae, macrofungi and for 38 groups of invertebrates. N (1996/1998) = 15,407, N (2009/2011/2013/2016) = 13,908. The number of species assessed has increased from 16,233 species in the old Red Lists to 18,512 species in the new Red Lists. However, as the available data was classified as insufficient for more species in the new Red Lists, the number of species evaluated from the new Red Lists is smaller than the number of species evaluated from the old Red Lists.

Thematic areas

B 1.1.2 Species diversity, C 2 Species conservation and genetic diversity

Definition

The indicator combines species endangerment data from German national Red Lists in a single measurement. The underlying data comprises the ranking of species in Red List categories.

Target

To sustain species diversity, an improvement in threat status by one category level is aimed at for all currently endangered species by 2020. This results in a target value of 11 percent for the groups concerned.

Core assessment

Calculated for the time being solely for 48 groups, the indicator stands at 19 percent for 2016. Major species conservation efforts are needed to attain the 11 percent target by 2020.

2.1.3. Conservation status of Habitats Directive habitats and species

The Habitats Directive promotes nature conservation in Germany in many ways, such as by requiring the designation of new protected areas and the performance of rigorous impact assessments. The species and habitat types listed in its annexes represent a major cross-section of biodiversity in Germany and the EU. They are found in a very wide range of ecosystems and are of outstanding conservation value. The requirements of the Habitats Directive correspond to almost all action areas covered in the National Strategy on Biological Diversity. Assessing the conservation status of Habitats Directive habitats[1] and species plays a key role in assessing the successes achieved under the EU Habitats Directive and the National Strategy on Biological Diversity. Every six years, the conservation status of Habitats Directive habitats and species is assessed in a national Habitats Directive report compiled on the basis of habitats and species monitoring, additional current data collated at national and Länder level, and expert assessments. The indicator combines the results for Germany in a simple overall measurement.

[Margin column: The indicator provides a summary assessment of the conservation status of Habitats Directive Annex I habitats and Annex II, IV and V species in Germany.]

Indicator

The indicator is an index compiled from assessments of the conservation status of Habitats Directive habitats and species in Germany. As in the last Indicator Report, the underlying data is taken from the national Habitats Directive reports 2007 and 2013, including the assessment results on Annex I habitats and the occurrences of Annex II, IV and V animal and plant species which are taken into account in both Habitats Directive reports. The fourth National Report (reporting period 2013 – 2018) under Article 17 of the Habitats Directive, submitted to the Commission at the end of August 2019, provides data for use in updating the indicator value that was not yet able to be included when calculating the indicator in this report.

The National Strategy on Biological Diversity sets a target by 2020 of significantly improving the conservation status of Habitats Directive habitats for which favourable conservation status has yet to be achieved. Likewise, a significant improvement in the conservation status of all coastal and marine species and habitats is to be achieved by 2020. A target value for the indicator is arrived at by applying this aim to all protected habitats and species and hence to all species listed in Annexes II, IV and V of the Habitats Directive. This corresponds with the Habitats Directive objective of

[1] The Habitats Directive protects particular occurrences of specific habitats. These are grouped into abstract habitat types as listed in Annex I of the Habitats Directive.

maintaining or restoring all Annex habitats and species at favourable conservation status. A significant improvement is defined as at least a one-category improvement in the conservation status of Habitats Directive habitats and species whose conservation status was previously unfavourable. The target for the indicator is consequently the index figure that will be attained if the assessment for all species and habitats whose conservation status was not classified as favourable in the 2007 Habitats Directive report improves by exactly one category. To make for an easily communicable target, the resulting figure is rounded. The outcome is a target of 80 percent for 2020.

[Margin column: In the National Strategy on Biological Diversity, the target is formulated as follows: "By 2020, all stocks of habitat types (in accordance with Annex I of the Habitats Directive), protected (Section 30 of the Federal Nature Conservation Act (BNatSchG)) and endangered biotope types as well as those for which Germany has a particular responsibility, or which are particularly significant for migratory species, indicate a significant improvement in their conservation status compared with 2005, in those cases where a good conservation status has not yet been achieved." (BMU 2007: 29).

[Margin column: For coastal and marine regions, the National Strategy on Biological Diversity sets a target of "significant improvement in the conservation status for all species and habitats" by 2020 (BMU 2007: 33).

[Margin column: German federal government objectives with a view to conserving habitats and species protected under the Habitats Directive:
Permanent protection of Natura 2000 areas, including provision of the necessary financing (action area C1, 'Interlinked biotopes and networks of protected areas').
Formulation and implementation of species conservation programmes to conserve and rehabilitate specific species and species groups (action area C2, 'Species conservation and genetic diversity').
Review of agricultural and environmental policy measures with a view to sustainability and financially viable opportunities to further improve nature compatibility within the context of EU agricultural support and national/European agricultural and environmental policy (action area C6, 'Agriculture and silviculture').

Composition

The indicator is compiled from assessments of the conservation status of each habitat and species separated into the three biogeographical regions relevant to Germany. This information is taken from the national Habitats Directive reports which are compiled every six years. The indicator currently combines the findings of the 2007 report (2001 – 2006 reporting period) and the 2013 report

(2007 – 2012 reporting period). The assessment of conservation status is classified into three levels shown as the colours of a traffic light: 'Favourable' (green), 'Unfavourable – inadequate' (yellow) and 'Unfavourable – bad' (red). An extra 'Unknown' category is used where assessment is not possible due to deficient data. In calculating the indicator, the trend in the conservation status during the reporting period is also included to provide a more finely graded range of indicator values. The trends are divided into groups as follows: Improving (positive) trend (+), worsening (negative) trend (–), neutral trend (=), and unknown trend (x). In compiling the index, the protected habitats and species are weighted according to conservation status assessment and trend. This means the better the assessment, the greater the weighting factor used. The indicator value is zero percent if the conservation status of all included habitats and species is assessed as 'unfavourable – inadequate' and 100 percent if the conservation status of all included habitats and species is assessed as 'favourable'. Habitats and species whose conservation status is classified as unknown are not taken into account when compiling the indicator. Habitats and species found in more than one biogeographical region are included multiple times in the index.

Sub-indicators are compiled in the same way as the aggregate indicator, in each case for a selected subset of the Habitats Directive habitats and species – for example, all Habitats Directive habitats and species predominantly found in coastal and marine areas.

Assessment

For the last reporting period (2007 – 2012), the index stands at 46 percent. This is a good four percentage points lower than in the first reporting period, 2001–2006. The index for species is 46 percent in reporting year 2013, a good two percentage points lower than in reporting year 2007; for habitats the index is 46 percent, a good eight percentage points lower. The value for habitats has thus decreased to a greater extent than that for species. As a favourable conservation status of Habitats Directive habitats is also a prerequisite for the long-term conservation of numerous endangered species, great importance is placed on their protection and improving their conservation status.

It should be noted that changes in conservation status do not always reflect real improvement or deterioration, and may relate instead to more accurate data, better knowledge or methodological changes. Looking solely at real instances of improvement or deterioration in conservation status in all three biogeographical regions between the two reporting periods 2001 – 2006 and 2007 – 2012, species showed 16 instances of improvement and 18 instances of deterioration, while for habitats there were no improvements and 13 instances of deterioration. The trend assessments also reflect the less favourable situation for habitats compared to species: the trend is positive for 16 percent

of species and negative for 25 percent. For habitats, by way of contrast, only two percent of the assessments indicate a positive trend, but 32 percent show a negative trend.

In the reporting period 2007 – 2012, the indicator values for Germany's three biographical regions vary significantly: the indicator stands at 72 percent in the Alpine region (ALP) and at just under 43 percent in the Continental (CON) region. In the Atlantic region (ATL), the indicator has only reached a value of around 35 percent.

Year	ALP **Protected species**	ALP Habitats	**ALP Total**	CON **Protected species**	CON Habitats	**CON Total**	ATL **Protected species**	ATL Habitats	**ATL Total**
2007	71%	79%	**74%**	42%	52%	**45%**	42%	42%	**42%**
2013	68%	79%	**72%**	44%	40%	**43%**	38%	31%	**35%**

Relative to the total number of Habitats Directive species and habitat types occurring in Germany's three biogeographical regions, the percentage of habitats and species assessed as 'red' in the reporting period 2007 – 2012 was 30 percent, the percentage assessed as 'yellow' was 34 percent and the percentage assessed as 'green' was 26 percent. The indicator value and the share of species and habitat types assessed as 'yellow' and 'red' show that much remains to be done – in many cases with only medium to long-term prospects of success – to improve the conservation status of Habitats Directive habitats and species in Germany and hence for the conservation of biodiversity in general. The Habitats Directive aims at favourable conservation status of the habitats and species it protects. The Natura 2000 network of protected areas is a key policy instrument in this regard. However, occurrences found outside of Habitats Directive sites are also included in the conservation status assessment.

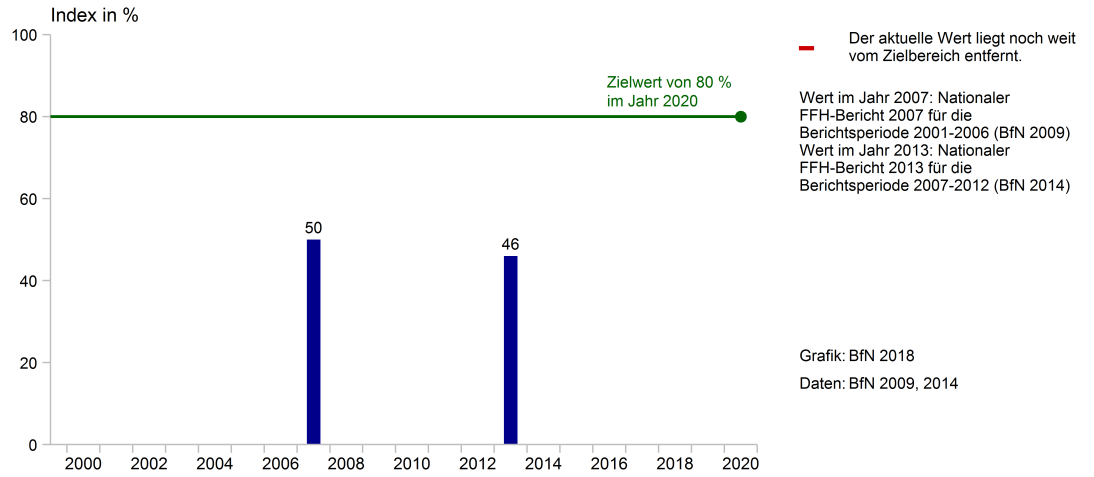
Sub-indicators are calculated in the same way as the aggregate indicator but relate in each case to a selection of Habitats Directive species and habitats, such as those whose occurrence is associated with specific vegetation types (forests, lakes and ponds, peatlands, etc.) (see table). The results highlight the fact that the need for action is greater with regard to habitats and species associated with peatlands (34 percent), coasts and sea (40 percent), and ecosystems shaped by farming that depend on management measures and sustainable use (40 percent) than to habitats and species associated with forests (55 percent) and mountains (65 percent).

Sub-indicators	Values
Conservation status of habitats and species in specific vegetation formations as classified in Section B 1.2 of the National Strategy on Biological Diversity	Coasts/sea 40 percent Lakes and ponds 48 percent Rivers and floodplains 46 percent Peatlands 34 percent Mountains 65 percent
Conservation status of habitats and species dependent on or significantly influenced by farming (open farmland only, including land under historical farming practices)	40 percent
Conservation status of forest habitats and species	55 percent

In the last reporting period, the situation of many species and habitats has been stabilised or even improved by means of targeted action, notably in the form of nature conservation measures. In many instances, however, this was not enough to counter negative influences. Due to EU infringement proceedings against Germany, the federal and state governments are currently giving high priority to the preparation of Habitats Directive management plans in the Natura 2000 network of protected areas. By April 2019, conservation measures had been established for about three quarters of all Habitats Directive sites.

As many protected habitats and species also occur outside the Habitats Directive sites, measures may also be necessary to maintain or achieve favourable conservation status overall. In particular, numerous species and habitats of the open countryside are dependent on sustainable, nature-compatible management measures. The conservation status of many habitats and species depends on the type of land use outside the area protected under nature conservation provisions. Improvements in conservation status thus require the combined effort of nature conservation practitioners and land users. Cooperation and collaboration must be stepped up in this regard.

Erhaltungszustand der FFH-Lebensräume und FFH-Arten



Thematic areas

Main thematic areas: B 1.1 Biodiversity, B 1.2 Habitats, C1 Interlinked biotopes and networks of protected areas, C 2 Species conservation and C 6 Agriculture and silviculture

Definition

Index (percentage index) of the weighted conservation status of the Habitats Directive habitats and species in Germany's three biogeographical regions

Target

An improvement in the conservation status of all habitats and species classified as 'unfavourable' in the 2007 report by at least one category (corresponding to an index value of 80 percent) by 2020

Core assessment

Based on the Habitats Directive report for 2013 (reporting period 2007 – 2012), the indicator value stands at 46 percent. This is still far from the target range. Efforts to improve the conservation status of Habitats Directive habitats and species must thus be significantly increased.

2.1.4. Invasive alien species

An alien species is classified as invasive if its presence outside its natural range poses a significant potential threat to naturally occurring ecosystems, habitats or species. This is the case, for example, when the spread of an invasive alien species displaces indigenous species at certain locations, placing them under threat of local extinction. Germany has a long history of settlement and land use in the course of which substantial exchange of species with other parts of the world has ensued. In the vast majority of cases, alien species arriving in Germany in this way have not proved invasive. While certain invasive alien species do constitute a major potential threat in Germany, by global standards the overall threat level is far lower than is the case, for example, for remote islands.

Alien species capable of endangering naturally occurring species and habitats mainly arrive in Germany by way of international transportation and trade. Alongside these negative impacts as regards nature conservation, invasive alien species can also have adverse economic impacts (e.g. for forestry and agriculture) or negative effects on human health (e.g. skin inflammation from giant hogweed).

Regulation (EU) No 1143/2014 of the European Parliament and of the Council on the prevention and management of the introduction and spread of invasive alien species (the IAS Regulation) entered into force on 1 January 2015. At the core of the Regulation is a list of invasive alien species of Union importance (Union list) for which measures for future management are laid down. The list is drawn up using risk assessments and scientific evidence and is regularly updated. Each species must meet certain criteria to be included in the list. The first Union List entered into force on 3 August 2016, listing 37 species. This was then extended, adding a further 12 invasive alien species. The extended list has been legally valid since 2 August 2017, although for one species (raccoon dog) the list is only valid as of 2 February 2019. With Implementation Regulation (EU) No 2019/1262 of 25 July 2019, a further 17 invasive alien animal and plant species were added to the Union list.

In some cases, measures have already led to a significant repression of individual invasive alien species on the Union list (e.g. water primrose in Lower Saxony and yellow skunk-cabbage in the Taunus region). When planning measures to stop the spread of invasive alien species in Germany, special priority is given to species that are just beginning to spread (early phase of invasion) and against which appropriate emergency measures can be taken with the aim of completely eliminating the populations (see Article 16 et seq. Regulation (EU) No. 1143/2014).

Various invasive alien species have been able to spread widely in Germany over a longer period and are thus classified as widespread under Regulation (EU) No 1143/2014). Management

measures for widespread invasive species, which generally have a high potential for reproduction and spread, usually have only limited success. They should aim to minimise the negative impact of these species on certain species, habitats or areas requiring special protection and, where appropriate, on human health or the economy (see Article 19 Regulation (EU) No 1143/2014).

[Margin column: The indicator assesses the number of invasive species in Germany which are on the Union list of Regulation (EU) No 1143/2014 and are in the early phase of invasion.]

Indicator

The indicator is based on the Union list of invasive alien species that is legally binding for Germany under the new Regulation (EU) No 1143/2014) on invasive alien species as of 2 February 2019. Thus, in terms of the underlying data used, it differs from the previously reported indicator, which was based on lists kept by the Federal Agency for Nature Conservation of invasive alien species already occurring in the wild in Germany, so that the two values are not comparable. In order to ensure consistency and thus comparability within the data series of the indicator reported here, the values for 2010, 2012 and 2014 were retroactively recalculated using the species selection in the above-mentioned Union list.

As data from June 2019 was used, the extension of the Union list in accordance with Implementing Regulation (EU) No 2019/1262 of 25 July 2019 has not yet been taken into account.

Two sub-indicators are still calculated, however. These have been adapted in line with the EU regulation but still correspond to the original concept:

- The first sub-indicator records the absolute number of species in Germany that are in the early phase of invasion and are not yet considered established (Article 16 et seq. Regulation (EU) No 1143/2014). All species that could be detected in Germany are taken into account (status in the environment: “unstable” or “isolated finds”).
- The second sub-indicator reported is the number of invasive alien species that were originally listed under the first sub-indicator, but since 2010 have overcome the early phase of invasion and are now considered widespread. These are thus transferred from the first sub-indicator to the second sub-indicator. This figure describes the extent to which ecosystems, habitats and species are threatened by invasive alien species that are newly established in Germany, may already be spreading rapidly and against which no suitable or successful immediate eradication measures could be taken.

The aim is to prevent the number of listed invasive alien species from increasing. If the measures implemented are successful, it is possible that the number of species could decrease again at an early stage of invasion.

[Margin column: "Non-native species (neobiota) enter Germany primarily as a result of international transport and trade flows, which may endanger or displace native varieties." (BMU 2007: 27)]

Composition

The number of invasive alien species on the Union list under Regulation (EU) No 1143/2014 occurring in Germany is totalled across all species groups. Currently, invasive alien species from five species groups occur in Germany (vascular plants, mammals, birds, fish and insects). With the addition of further species to the Union list, the underlying data for the two sub-indicators will expand, so that the indicator values will likely also change retroactively.

Assessment

In each of 2010 and 2012, six Union list species occurred in Germany that were in the early stages of invasion (2 vascular plant species, 2 mammal species and 2 bird species). Subsequently, the number increased, initially to a total of eight species (1 fish and 1 insect species on the Union list were newly detected in Germany after 2012) and then to nine species in 2018 (1 further vascular plant species on the Union list was detected in Germany, see list below). Under Article 17 of Regulation (EU) No 1143/2014, emergency measures are to be taken against species in the early phase of invasion. Since 2010, none of the species in the first sub-indicator have become established in Germany. Currently, the second sub-indicator, which records the species considered widespread compared to 2010, thus has a value of zero. However, the goal of removing invasive species from the first sub-indicator list as a result of successful control measures has not yet been achieved as new introductions are still occurring despite the immediate action taken. It can, however, be assumed that the restrictions under Article 7 (1) of Regulation (EU) No. 1143/2014 on keeping and breeding and on transport and trade, which apply to all species on the Union list, will successively minimise new releases in the future.

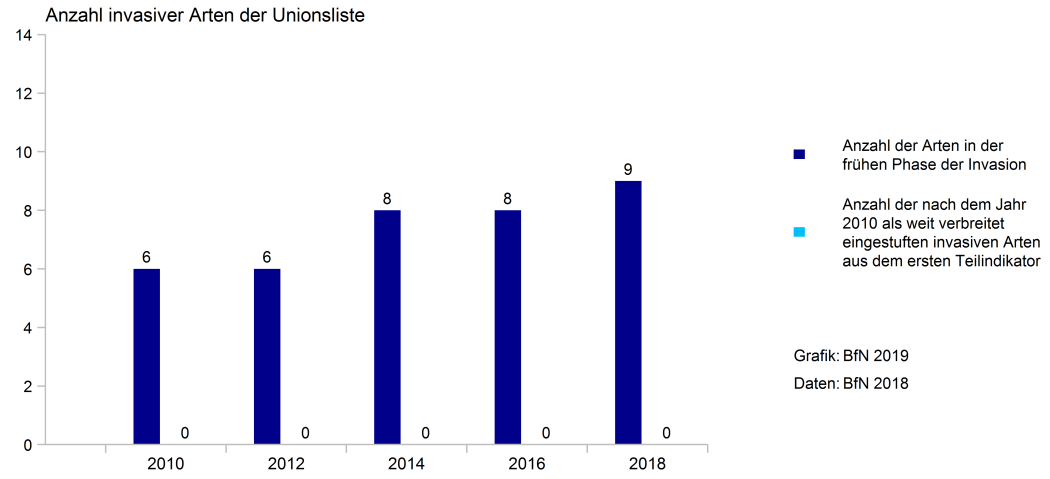
In its National Strategy on Biological Diversity, the Federal Government proposed a range of measures to reduce the impact on biodiversity from invasive alien species. With the entry into force of Regulation (EU) No 1143/2014 of the European Parliament and of the Council on the prevention and management of the introduction and spread of invasive alien species (IAS Regulation), the member states are required to initiate appropriate management measures. Special importance must be attached to prevention in order to counter threats to ecosystems, habitats and species

from invasive alien species. Any invasive alien species reaching Germany must be prevented from settling and spreading further by means of early detection and immediate action.

Species on the Union list of Regulation (EU) No 1143/2014 which occur in Germany and are in the early phase of invasion (Article 16 et seq.)

Scientific name	Common name	Occurrence	Status
Tracheophyta	**Vascular plants**		
Cabomba caroliniana	Carolina fanwort	from 2010	Unstable
Eichhornia crassipes	Water hyacinth	from 2010	Isolated finds
Ludwigia peploides	Floating primrose-willow	from 2018	Isolated finds
Mammalia	**Mammals**		
Muntiacus reevesi	Reeves's muntjac	from 2010	Isolated finds
Nasua nasua	South American coati	from 2010	Isolated finds
Aves	**Birds**		
Oxyura jameicensis	Ruddy duck	from 2010	Unstable
Threskiornis aethiopicus	African sacred ibis	from 2010	Isolated finds
Pisces	**Fish**		
Perccottus glenii	Chinese sleeper	from 2012	Unstable
Insecta	**Insects**		
Vespa velutina nigrithorax	Asian hornet	from 2012	Unstable

Invasive Arten



Thematic areas

B 1.1.2 Species diversity

C 3 Biosafety and preventing the adulteration of fauna and flora

Definition

Number of Union list invasive alien species seperated into the number of species in the early stage of invasion and the number of species that since 2010 have overcome the early phase of invasion and are now considered widespread

Qualitative target

The number of invasive alien species newly spreading in Germany must be minimised; an increase in the number of widespread invasive alien species must be prevented.

Core assessment

Immediate action must be taken against nine Union list invasive alien species which were in the early stage of invasion in 2018. Since 2010, none of the species in the first sub-indicator has been classified as widespread in Germany.

2.1.5. Protected areas

Designation of endangered and valuable sites as protected areas is a key instrument in the nature conservation toolkit. In a landscape shaped almost everywhere by human land use, protected areas provide essential retreats for plant and animal life. In the National Strategy on Biological Diversity, the 'Interlinked biotopes and networks of protected areas' action area highlights the importance of designating protected areas and linking them in a network for biodiversity conservation.

Germany has various protected area categories subject to widely differing legal requirements. With the exception of protected areas in the Exclusive Economic Zone (EEZ)[2], designation of protected areas is carried out by the German Länder (states). Strict conservation rules apply in nature conservation areas and national parks to safeguard the conservation and development of rare and endangered species and habitats. In the case of national parks, their large size and undisturbed development also play an important role. They have the objective of allowing nature to run its course as far as possible without human interference over the major part of their territory. In Germany, nature conservation areas and national parks are vital instruments in the conservation of biodiversity. Nature conservation areas and national parks form key elements of the national habitat network to be established under Article 21 of the Federal Nature Conservation Act (BNatSchG) and of the German part of the European Natura 2000 network of protected areas. They are also important in efforts to build a global protected area network. The area of land designated in the nature conservation area and national park protected area categories is thus used as an indicator for protected areas policy under the National Strategy on Biological Diversity.

In addition to national parks and nature conservation areas, other types of protected areas are also subject to strict protection, such as the European Natura 2000 protected areas network, core and maintenance zones of biosphere reserves and also national nature monuments. The share of German land surface covered by areas subject to strict to protection, nature conservation areas and national parks amounts to 16.2 percent. The categories named overlap to an extent with national parks and nature conservation areas.

[Margin column: The indicator assesses the designated nature conservation areas and national parks as a measure of protected areas policy.]

[2] Between 2 and 200 nautical miles from the coast

[Margin column: The Federal Nature Conservation Act makes provision for a number of categories with differing protected status: nature conservation areas, national parks, national nature monuments, biosphere reserves, landscape protection areas, nature parks, natural monuments, protected landscape elements and legally protected biotopes (Articles 23-30 of the Act) and Natura 2000 sites (Article 32).

Indicator

The protected areas indicator assesses the total area of Germany's nature conservation areas (NCAs) and national parks (NLPs) as strictly protected areas. For this purpose, the area of land designated as nature NCAs and NLPs is expressed as a percentage of German land surface. Natura 2000 sites, core areas and buffer zones of biosphere reserves are included if designated as NCAs or NLPs.

In the National Strategy on Biological Diversity, the Federal Government sets itself various targets relating to protected areas. By 2010, Germany aimed to have a representative and functional habitat network covering 10 percent of its territory. A further aim is for nature to be able by 2020 to run its course undisturbed on two percent of German territory. Completion of the European Natura 2000 network of protected areas was also planned for 2010. The designation of strictly protected areas (NCAs and NLPs) goes a significant way towards achieving these goals.

Composition

The Länder have been reporting data on land covered by NCAs and NLPs to the Federal Agency for Nature Conservation (BfN) since 2000. For this purpose, the area of land designated as NCAs and NLPs is expressed as a percentage of German land surface. The respective shares are presented both separately and as a combined total for the reporting years. In some places, areas have been designated as both NCAs and NLPs, such as in the 'Unteres Odertal' NLP. For the purposes of this indicator, these sites are counted as NLP land. However, the overlap amounts to less than one percent of the total area of these protected area types. The area of land comprising the core and maintenance zones of biosphere reserves, Natura 2000 areas and national nature monuments also designated as NCAs or NLPs are not listed separately.

[Margin column: The 'Interlinked biotopes and networks of protected areas' action area in the National Strategy on Biological Diversity highlights the central importance of designating protected areas and linking them in a network for the conservation of biodiversity (BMU 2007: 64): "One of the main ways of conserving species diversity and genetic diversity of wild fauna and flora varieties

is by protecting their habitats. The system of interlinked biotopes and networks of protected areas play a central role in conserving reproduction-viable populations."]

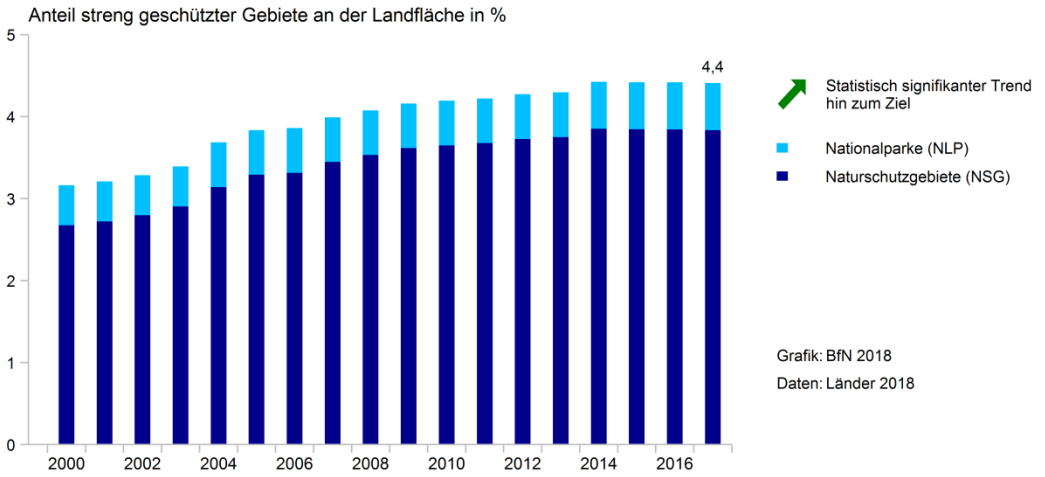
[Margin column: "By the year 2020, throughout 2% of Germany's territory, Mother Nature is once again able to develop undisturbed in accordance with her own laws, and areas of wilderness are able to evolve. By 2010, Germany has a representative and functional system of interlinked biotopes covering 10% of its territory. This network lends itself to permanently protecting the habitats of wild species and is an integral component of a European system of interlinked biotopes." (BMU 2007: 28)

Assessment

The area of land designated as NCAs and NLPs increased from 1.1 million ha in 2000 (3.2 percent of German land surface) to 1.6 million ha in 2017 (4.4 percent). While the area covered by NCAs is subject to constant change and grew steadily from 2000 to 2014, the area covered by NLPs only increased between 2003 and 2004 after establishment of the 'Eifel' National Park in North Rhine-Westphalia, the 'Kellerwald-Edersee' National Park in Hesse, the 'Black Forest' National Park in Baden-Württemberg in 2014 and the 'Hunsrück-Hochwald' National Park in Rhineland-Palatinate and Saarland in 2015. The increase in the size of NCAs and NLPs is partly attributed to the implementation of the Natura 2000 network. As the progress of bringing nominated Natura 2000 sites under statutory protection is now well advanced in Germany, the area of NCAs and NLPs the overall size of NCAs and NLPs is only expected to increase by a moderate amount. This is mainly because most of the areas are now legally protected and the Länder also select other forms of protection besides designating areas as NCAs and NLPs.

As well as requiring formal designation, protected areas also need proper care and management in line with the respective nature conservation objectives. Attention must also be paid to ensuring that protected areas are properly linked in an ecological network. At present, a qualitative assessment can only be made for some of the areas covered by the indicator. An evaluation of Germany's national parks has been completed and the results were published by EUROPARC Germany in 2013.

Gebietsschutz



Thematic areas

B 1.1.3 Diversity of habitats

C 1 System of interlinked biotopes and networks of protected areas

Definition

Total size of nature conservation areas (NCAs) and national parks (NLPs) as a percentage of German land surface.

Qualitative target

The designation of strictly protected areas (NCAs and NLPs) makes an important contribution among other things towards securing the national habitat network and to placing Natura 2000 sites under protection.

Core assessment

The total size of nature conservation areas and national parks increased between 2000 and 2017, from 3.2 percent to 4.4 percent of German land surface.

2.1.6. Ecological status of surface waters

Clean, near-natural waters are vital to the conservation of biodiversity in Germany. Rivers, streams, lakes, transitional waters and coastal waters are home to numerous species and habitats that are highly sensitive to adverse influences such as nutrient pollution, contamination and engineering works. Until the 1970s, waters were severely polluted by effluent from sewage works and industry, and by run-off from nearby farmland. In recent decades, diverse efforts in water pollution control have improved both chemical and biological water quality so that many animals and plants have been able to return to the cleaner waters. The improvement in water quality is mainly due to the reduction of wastewater pollution, while diffuse nutrient inputs, especially from agriculture, have only decreased slightly. As the nutrient load of water bodies is still too great, nutrient levels in many waters are correspondingly high. In addition, major deficits in the water structure impair the ecological status of surface waters. Engineering works, river straightening and the draining of floodplains result in structural impoverishment, loss of species diversity and changes in natural flood regimes. Watercourses are no longer passable for many organisms and sediment due to some 200,000 transverse structures. These radical changes as well as excessive inputs of fine sediments, pollutants and nutrients are currently the major stress factors in Germany's water bodies today.

According to the requirements of the Water Framework Directive 2000/60/EC, an integrated approach to conservation and use of European surface waters is pursued. The objective is to achieve good ecological and chemical status, which is defined as no more than a slight deviation from the prevailing natural conditions. In radically altered and artificial water bodies that have been heavily modified or constructed for specific uses, the target of good ecological potential applies. This means that all natural habitats compatible with the use of the water bodies must be restored. This indicator reports good ecological status and good ecological potential. For the purposes of simplification, both conditions are referred to collectively as 'ecological status' in the indicator.

[Margin column: The indicator provides information on the ecological status of rivers, streams, lakes, transitional waters and coastal waters.]

Indicator

The indicator reports the proportion of surface water bodies – sections of rivers, streams, lakes, transitional waters and coastal waters – with good or high ecological status as a percentage of all assessed surface water bodies (slightly more than 9,800 in 2015). Under the Water Framework Directive, water assessment is based on the organisms living in the water as the composition of the aquatic biotic communities reflects the influencing factors for the respective water body type.

In accordance with the provisions of the Water Framework Directive and with the objectives of the German National Strategy on Biological Diversity, the general aim is at least good ecological status in all water bodies by 2015. For heavily modified waters and for artificial waters, the target is what is termed good ecological potential. It should be noted that the Water Framework Directive permits exemptions from target attainment, including extensions of the timescale up to 2027.

[Margin column: "By 2015, a good ecological and chemical quality status has been achieved for all waters in the coastal region." (BMU 2007: 33)]

[Margin column: "By 2015, as a minimum requirement, a good ecological and chemical status (Water Framework Directive) has been achieved [for lakes, ponds and pools] …" (BMU 2007: 34)]

Composition

The indicator is based on water status monitoring in accordance with the Water Framework Directive. The ecological status of individual sections of rivers, lakes or coastal waters is assessed. The water body is the underlying monitoring unit. Water bodies are considered distinct where there is a change in category (river, lake, transitional waters or coastal waters), type (e.g. gravel-bedded large river, sandy-bedded lowland stream) or status (e.g. good, moderate). The waters surveyed consist of running waters with a catchment area of at least 10 km^2 and lakes of at least 50 ha. Almost 9,800 water bodies are identified in Germany (9,000 in rivers and streams, 732 in lakes, 5 in transitional waters and 75 in coastal waters).

The ecological status of a water body is ranked according to how far it deviates from the natural state in terms of its biotic community and is assessed based on the occurrence and frequency of species typical for the respective water body type: fish, invertebrates, macrophytes and algae. There are five status levels: high, good, moderate, poor and bad. If a water body's different biological quality elements attain different scores, the water body is given the ranking attained by the element with the worst score. Scoring is done with reference to invertebrate fauna (macrozoobenthos), fish fauna, and flora (macrophytes, phytobenthos and phytoplankton). A water body that does not meet the environmental quality standard for a regionally significant pollutant cannot be ranked better than moderate ecological status. Physical and chemical parameters such as nutrient levels, temperature and salinity must also be in a range that allows ecosystems to function.

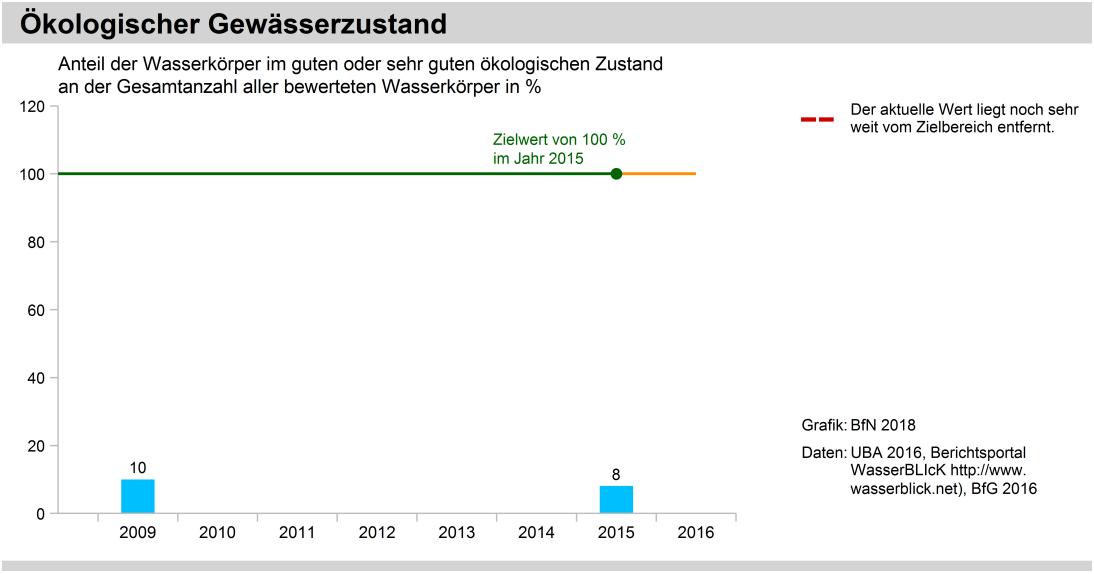
The results of water ecological status monitoring are documented every six years in management plans. The first management cycle ran from 2009 to 2015. Thus, data on the ecological status of water bodies is available for 2009 and 2015, and subsequently every six years.

[Margin column: "By 2015, in accordance with the requirements of the Water Framework Directive, a good ecological and chemical status or ecological potential of the rivers has been achieved; ecological passability has been restored. … Populations of fish fauna characteristic of the respective watercourse are permanently protected." (BMU 2007: 35)]

[Margin column: Macrozoobenthos: Bottom-living invertebrates visible to the naked eye
Macrophytes: Water plants visible to the naked eye
Phytobenthos: Bottom-living algae
Phytoplankton: Floating algae]

Assessment

Applying the classification standards of the Water Framework Directive, only eight percent of German water bodies attained good or high ecological status in 2015. This result is dominated by the assessment for running waters in Germany (7 percent of which attained good or high ecological status), as these account for the majority of water bodies. The result for lakes was more positive, with 26 percent attaining good or high ecological status. The situation was far worse for coastal and transitional waters, where almost all water bodies failed to attain good or high ecological status. Compared with 2009, the indicator decreased only marginally by about two percent. This is primarily due to methodological adjustments in the assessment, which remained necessary beyond 2009. The most frequent reasons for rivers and streams attaining moderate, poor or bad ecological status are changes in hydromorphology (e.g. as a result of engineering works, river straightening and regular maintenance), lack of ecological passability, and high inputs of pollutants, nutrients and fine sediments, largely from farming. These adverse impacts are reflected in significant changes in the natural aquatic communities. Nutrient pollution is the most frequent reason for lakes, transitional waters and coastal waters failing to attain the required ecological status. In 2015, however, fewer water bodies attained bad or poor status and more attained moderate status than in 2009.



Thematic areas

B 1.2.2 Coastlines and oceans, B 1.2.3 Lakes, ponds, pools and lagoons

B 1.2.4 Rivers and floodplains, C 4 Water protection and flood prevention

Definition

Proportion of surface water bodies – sections of rivers, streams, lakes, transitional waters and coastal waters – with good or high ecological status as a percentage of all assessed water bodies

Target

In principle, 100 percent of the water bodies attain good or high ecological status by 2015.

Core assessment

Only 8 percent of water bodies attained good or high ecological status in 2015. The most frequent causes of impairment are changes in the structure of water bodies and large nutrient inputs from agriculture.

2.1.7. Status of floodplains

Rivers and their floodplains are of great importance in biodiversity conservation. They provide habitats for numerous species that are adapted to the specific conditions – notably flooding regimes and the availability of water – and often serve as ecological corridors of transregional importance. Floodplains are also important as flood retention areas essential to protecting against flood damage. Both aspects – biodiversity conservation along rivers and flood risk management – are thus integral to action area C4 'Water protection and flood prevention' under the National Strategy on Biological Diversity.

Based on the outcomes of several research projects, a status report on Germany's major river floodplains (*Auenzustandsbericht*) was published in 2009 (BMU & BFN 2009). This was the first publication to present the status of German river floodplains on a nationwide basis. The next river floodplain status report will be published in spring 2021. The data can be used to examine the National Strategy on Biological Diversity targets concerning improvements in the status of floodplains. These include the aim of conserving running waters and floodplains with regard to their function as habitats to ensure a diversity of organisms and habitats characteristic of Germany's physiographic regions by 2020. Likewise by 2020, action is to be taken to ensure that a majority of watercourses have more natural flood retention areas than they do today (at least a 10 percent enlargement of river floodplain retention areas).

[Margin column: The indicator provides information on the status of floodplains as a habitat for plants and animals.]

Indicator

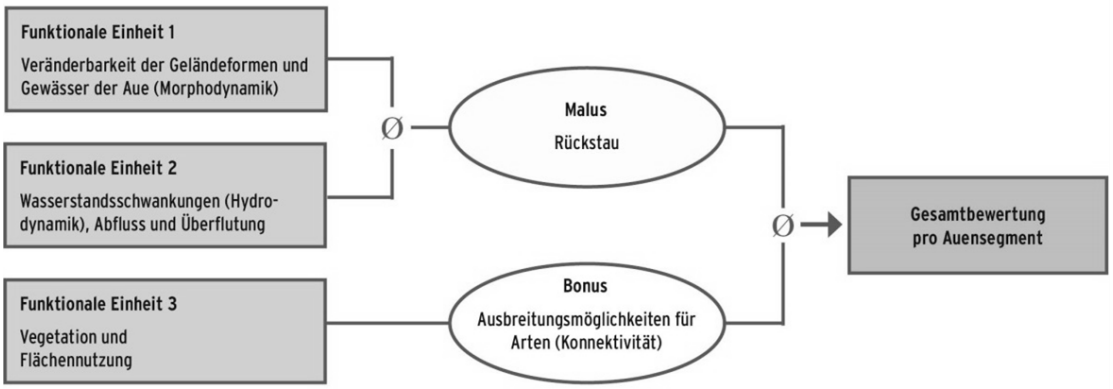
The indicator is compiled as an index reflecting the condition of all river floodplains in the Floodplains Status Report. The status of floodplains provides a summary assessment of local morphological and hydrological conditions and of floodplain land use. These factors are key determinants of habitat quality for plants and animals in floodplains.

Based on the findings of the Floodplains Status Report, a quantitative target is set for the indicator with an improvement of 10 percentage points in the status of floodplains nationwide aimed for by 2020 relative to the indicator value in 2009.

Composition

The data used in compiling the indicator is currently being updated and will be published as a second Floodplains Status Report in spring 2021. As a result, the indicator value reported here is still based on the floodplain status report published in 2009.

The area surveyed consists of the sections of river floodplains that are still capable of being inundated, beginning in each case at the point on a river where its catchment area exceeds 1,000 km^2. Tidal reaches are not included. The survey area consequently covers the larger floodplains in all 79 rivers (10,276 kilometres of river and a total of 15,533 km^2 of floodplain), divided into the main catchment areas of the Rhine, Elbe, Danube, Weser, Ems, Oder and Maas along with other rivers flowing directly into the North Sea and the Baltic Sea. Floodplains are assessed in segments of 1 km length, with floodplains to the left and right of a river treated separately. Three key functional aspects of floodplains are considered: floodplain relief, flood discharge regime and distribution of vegetation and land use (see chart below).



Assessment of the main functions incorporates a wide range of floodplain-related parameters from various nationally available data sources, notably river structure data and land use data from the Digital Landscape Model (DLM25).

The floodplain status assessment distinguishes five status classes ranging from ‘near-natural’ (Class 1) to ‘totally modified’ (Class 5). The assessment is based on the national floodplain typology approach in KOENZEN (2005). As with assessments under the European Water Framework Directive, it relates to a reference condition free of human influence. In the case of floodplains, this is referred to as the ‘potential natural status’. For the purpose of compiling the index, the classes are subject to increasing weightings. The value of the index theoretically ranges from zero percent (all floodplains totally modified) to 100 percent (all floodplains in a near-natural state).

Floodplain status		Weighting
1	Nearnatural	16
2	Slightly modified	8
3	Considerably modified	4
4	Severely modified	2
5	Totally modified	0

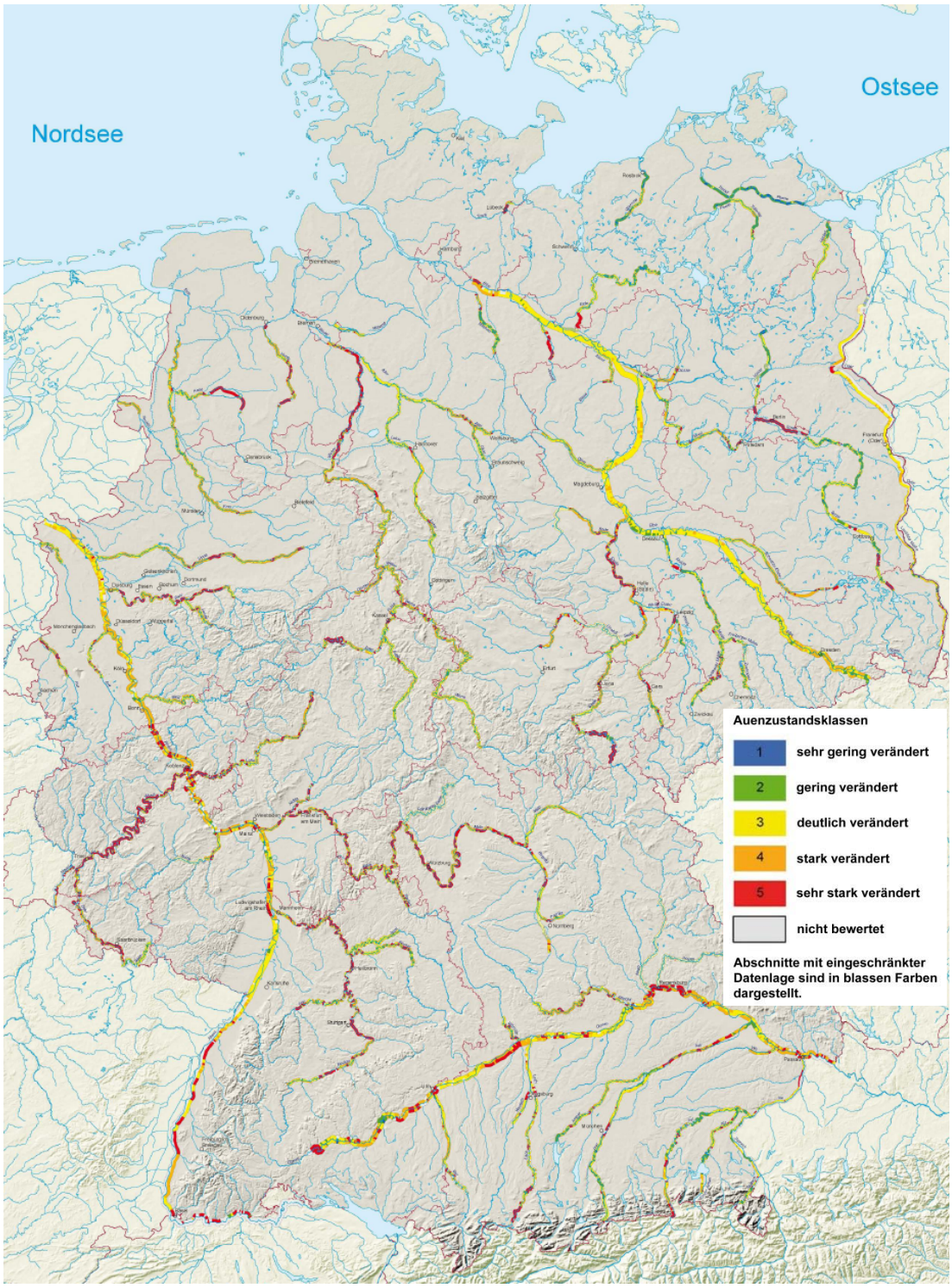
[Margin column: "By 2020, watercourses and their water meadows will be protected in their role as habitats, and the typical diversity of the natural area in Germany will be guaranteed." […] By 2020, the majority of watercourses have more natural flood plains." (BMU 2007: 35)]

Assessment

The German floodplain status index for 2009 stands at 19 percent. It reflects the overall severe floodplain degradation. The main reasons for the poor condition of floodplains in Germany are intensive floodplain land use, severe restriction of flooding areas, extensive river canalisation and the effects of barrages.

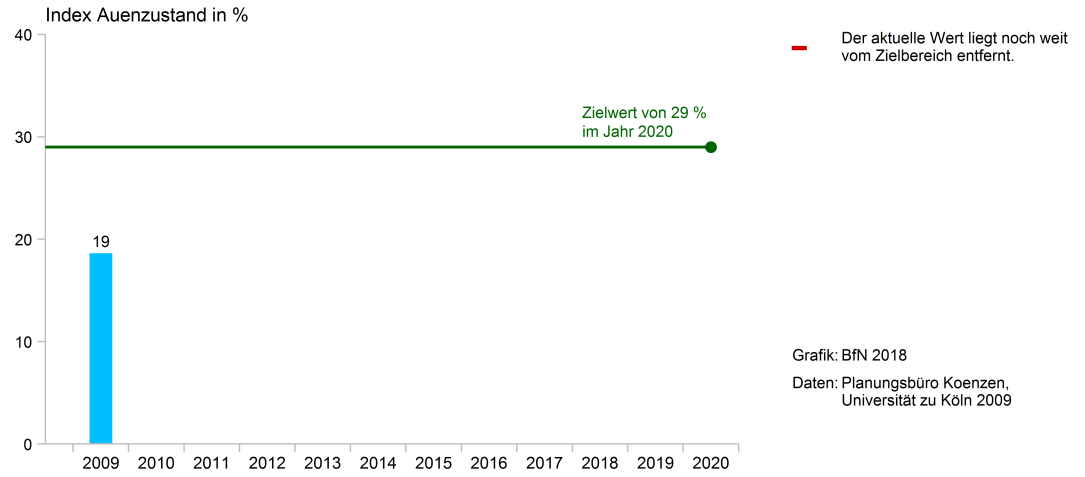
Great efforts need to be directed in the future to the conservation and development of floodplain biodiversity. The Federal Government thus aims to markedly improve the status of flowing waters and floodplains by 2020 and take action to enlarge natural flood retention areas. In the past 25 years, 170 floodplain restoration projects have been implemented on rivers and approximately 5,500 ha of floodplain on 22 rivers were reclaimed between 1996 and 2017, which corresponds to a gain of about one percent (BMUB & BfN 2015, Ehlert & Natho 2017). Reclamation of natural floodplains is also reported as an indicator in the German Strategy for Adaptation to Climate Change in the "Biodiversity" action area and shows a slight positive trend (UBA 2015). Nonetheless, there is no evidence of a trend reversal in floodplain condition or floodplain protection. The effectiveness of individual projects is mostly localised and contrasts with ongoing degradation of other floodplain segments. The Floodplains Status Report 2020 will map the changes of the past 10 years and provide data for use in updating the indicator value.

Floodplain status in Germany



Source: Chart: Federal Agency for Nature Conservation (BfN), 2009, Data: Brunotte et al. 2009

Zustand der Flussauen



Thematic areas

B 1.2.4 Rivers and floodplains, C 4 Water protection and flood prevention

Definition

Index (percentage index) compiled from weighted status classes for all major German river floodplains included in the Floodplains Status Report (*Auenzustandsbericht*)

Target

10 percentage point improvement in the status of floodplains nationwide by 2020 compared with the indicator value in 2009 (increase to 29 percent)

Core assessment

Overall, the major German river floodplains are severely modified (indicator value 19 percent in 2009). Great efforts continue to be required to conserve and develop biodiversity in river floodplains.

2.2 Settlement and transport

2.2.1. Increase in land use for settlement and transport

Land is a finite and valuable resource. In addition to nature conservation, there are many competing potential uses for undeveloped land. These include farming and forestry, settlement and transport, resource extraction and energy generation – and in particular the area of land used for settlement and transport is steadily increasing. Undeveloped land is needed to help secure ecological services, for biodiversity conservation and for recreation in the countryside as well as in green urban spaces. Direct environmental impacts of increasing land use for settlement and transport include loss of ecological soil services caused by surface sealing, loss of fertile farming land, and loss of near-natural land and its associated biodiversity. The steady decline in agricultural land reduces the potential contribution of farming to food production.

The 'Increase in land use for settlement and transport' indicator was selected as a key sustainability indicator for land use under the National Sustainability Strategy and incorporated into the National Strategy on Biological Diversity. It is thus also regularly reported in the indicator reports published under the National Sustainability Strategy, most recently in the Indicator Report 2018 (STATISTISCHES BUNDESAMT 2018).

[Margin column: The indicator provides information on negative impacts on biodiversity from the increase in land use for settlement and transport.]

Indicator

The indicator tracks the average increase in land use for settlement and transport in Germany, measured in hectares per day. In addition to buildings and open space, the areas taken into account in the indicator include production and transport, recreational areas and cemeteries. Land use for settlement and transport cannot be equated with sealed land as the settlement and transport area is partly unbuilt and unsealed. Based on recent research, sealed land is estimated to account for between 43 and 50 percent of land used for settlement and transport.

On adopting the National Sustainability Strategy in 2002, the Federal Government followed the recommendation of the German Council for Sustainable Development in setting a 2020 goal for new land use for settlement and transport of an average daily maximum of 30 ha. In the new edition of the National Sustainability Strategy, a target of "less than 30 hectares" (30 minus X) was postulated for the year 2030, although it was not specified by how much the 30 hectares should be undercut in 2030. In the Integrated Environmental Programme (IUP), the Federal Ministry for the

Environment (BMU) specifically advocates reducing land use to a maximum 20 hectares per day to follow the line set out in the Climate Action Plan 2050. In accordance with the European Union's Resource Efficiency Roadmap and the Federal Government's Climate Action Plan, the transition to a circular land use economy (net-zero target) is to be achieved by 2050 at the latest. Changes in the indicator show the extent to which the spread of settlement and transport area has been limited to the benefit of more natural habitats.

[Margin column: According the German Sustainability Strategy, use of new land for settlement and transport is to be reduced nationwide to an average of less than 30 ha per day by 2030 (BUNDESREGIERUNG 2017).

Composition

The indicator covers land use for:

- Buildings, green spaces and production (excluding resource extraction)
- Recreation and cemeteries
- Transport

Up to and including 2015, the data used was provided by automated cadastral registers on settlement and transport areas. These are analysed by the statistical offices of the Länder (states) and collated by the Federal Statistical Office. To obtain a meaningful indicator figure, the increase in land use for settlement and transport is calculated for each reported year as an average in hectares per day. As figures on a single year are often distorted by extraneous factors, the long-term trend is better reflected by using a multi-year average (in this case a four-year rolling average presented as a curve). At the beginning of 2016, the area statistics were converted to the Authoritative Real Estate Cadastre Information System (ALKIS) and revisions were initiated. This currently impairs time comparison and makes it difficult to calculate changes. For this reason, development of the indicator from 2016 onwards is only shown as a four-year rolling average.

Assessment

In recent years, the growth in settlement and transport area has slowed down with a discernible trend. The four-year rolling average dropped continuously from 129 ha per day in 2000 to 58 ha per day in 2017. This trend does not correspond with construction investments, which fell significantly between 2000 and 2005, but were subject to some fluctuations thereafter, partly due to the financial and economic crisis (STATISTISCHES BUNDESAMT 2017b). Consequently, increased investments were not reflected in the form of increased new land use, but were largely channelled into brownfield development and maintenance and expansion of existing building structures. By way of contrast,

the decrease in land use corresponds well with the decline in the completion of new buildings, especially residential buildings. While there has been an increase in the completion of new residential buildings since 2010, this was much more pronounced in land-saving multi-storey residential construction (multi-family dwellings) than in land-consuming construction of detached and semi-detached houses, so that – despite a slight increase in residential construction – new land use in this area was significantly lower than in the years prior to 2010.

Overall, land used for buildings, green spaces and production (excluding resource extraction) has increased by 9.0 percent in the past 16 years, while the population has only increased by 0.3 percent (and has even declined in the meantime), whereas price-adjusted gross domestic product (GDP) has increased by 23.9 percent. Thus, built-up or otherwise intensively used settlement area (i.e. buildings, green spaces and production) grew per capita from 289.5 m² to 314.7 m². More space is thus occupied for housing as well as for commerce and public and private services.

The increase in housing is partly due to the fact that older, smaller households often remain in their large accommodation after the children have moved out (empty nest effect) and partly due to younger people living alone or in pairs without children for longer, thus occupying more living space per capita than family households. Some households also benefit from increased incomes, which enable them to live in more upmarket accommodation covering a larger space. The living space occupied in dwellings (including residential homes and dwellings in non-residential buildings) increased from 39.5 m² per inhabitant in 2000 to 46.5 m² per inhabitant in 2016, although the increase in per capita living space has slowed down significantly since 2011 (Statistisches Bundesamt 2019, Institut der deutschen Wirtschaft 2019, Statista 2019).

There has also been a steady expansion of buildings, green space and production space for commercial, retail and logistics on greenfield sites, although the pace has been slower than in the early 2000s and significantly slower than GDP growth, i.e. value creation has become at least a little more land-efficient in the overall balance.

The land area used for transport has increased by about 5.3 percent in the past 16 years. Vehicle kilometres driven on the roads also increased steadily during this period and in 2016, for example, were 16.0 percent higher for private motorised transport than in 2000 (BMVI 2017). Existing roads were thus used more intensively.

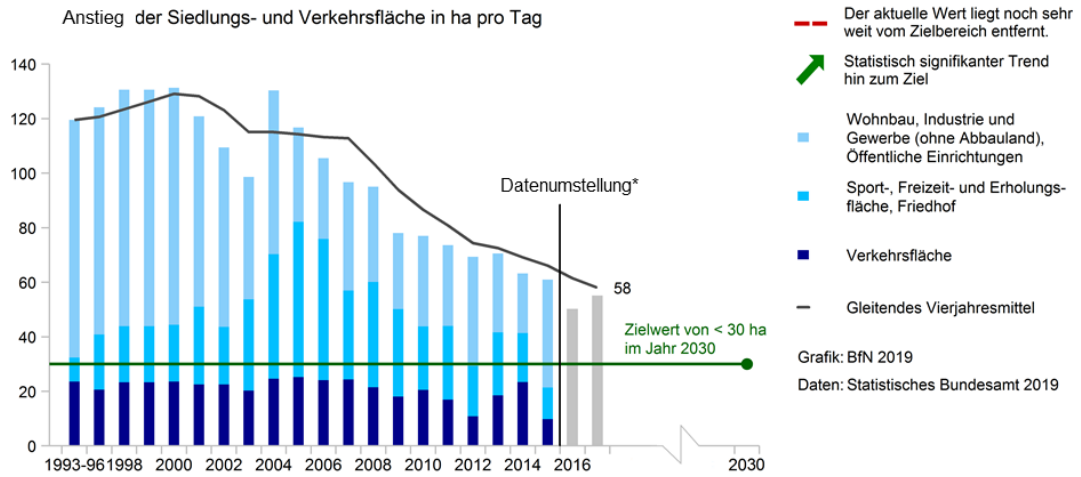
Development of land for settlement in 2005, 2006, 2008 and 2009 was temporarily dominated by an increase in recreation land due to changes made in the cadastral registers, so that the figures on land used for recreation are only of limited significance.

Keeping the indicator trend at a level equal to the average annual trend of recent years would not be enough to achieve the target of reducing the increase in land use for settlement and transport to a maximum of 30 ha per day by 2030, as called for in the new edition of the National Sustainability Strategy. This means that existing instruments and measures to reduce land take need to be rigorously applied, enhanced and supplemented with new instruments. For example, settlement development planning should place greater emphasis on reuse of brownfield sites, including former industrial plants and other abandoned sites. In such cases, the guiding vision is the dual approach to urban development, combining urban densification with qualitative and quantitative improvements in the provision of green elements and open spaces. Action is also needed to raise public awareness of the need to limit the increase in land use for settlement.

In line with the necessary further development of the federal transport infrastructure, the central steering instrument, the Federal Transport Infrastructure Plan (BVWP) 2030, deals, among other things, with the limitation of additional land use, avoidance of further loss of undissected low-traffic areas and maintaining existing infrastructure stock (see also Chapter 2.2.2). For the first time, the plan has been subject to a strategic environmental assessment (SEA), which also takes into account the protected resource of land.

[Margin column: Targets adopted by the German federal government with regard to the increase in land use for settlement and transport include (BMU 2007: 51):
"To guide land use in favour of restoring usability,
increasing density of use, and other brownfield development measures,
To transform the economic and fiscal framework conditions to encourage the sparing use of land and the activation of derelict and contaminated sites,
To consistently apply the existing planning mechanisms to minimise land use and, where applicable, to update the relevant planning instruments […]
To intensify inter-community cooperation in the designation of sites for residential and commercial areas on the basis of existing pilot projects, with immediate effect."]

Flächeninanspruchnahme



* Die Datenbasis für Auswertungen der Siedlungs- und Verkehrsfläche ist die Flächenerhebung. Mit Beginn des Jahres 2016 wurde diese Statistik auf das Amtliche Liegenschaftskataster-Informationssystem (ALKIS) umgestellt und es wurden Überarbeitungen eingeleitet. Dadurch ist derzeit der Zeitvergleich beeinträchtigt und die Berechnung von Veränderungen wird erschwert. Die nach der Umstellung ermittelte Siedlungs- und Verkehrsfläche enthält weitgehend dieselben Nutzungsarten wie früher.
Weitergehende Erläuterungen siehe www.destatis.de/DE/Themen/Branchen-Unternehmen/Landwirtschaft-Forstwirtschaft-Fischerei/Flaechennutzung/Publikationen/Downloads-Flaechennutzung/bodenflaechennutzung-2030510177004.pdf?__blob=publicationFile&v=5#page=412

Thematic areas

B 2.7 Land use for settlement and transport

C 9 Settlement and transport

Definition

Average increase in land use for settlement and transport in ha per day (four-year rolling average)

Target

The increase in land use for settlement and transport is to be reduced to an average of 30 ha per day by 2030.

Core assessment

The four-year running average fell from 129 ha per day in 2000 to 58 ha per day in 2017. Despite the positive trend, the current value is still very far from the target. Consequently, instruments and measures to reduce the increase in land use must be rigorously applied, enhanced and supplemented with new instruments.

2.2.2. Landscape dissection

Linear infrastructures lead to an impairment in landscape quality and thus to its recreational suitability due to disturbances and emission axes (especially noise and pollutants). They also lead to a separation of human and animal habitats on account of transport axes that are difficult to overcome. The objective of conserving undissected, low-traffic areas originated in recreational planning but is now also applied in biodiversity conservation. An analysis of landscape dissection looks at the main elements of transport networks, consisting of roads, railway lines and canals. Undissected, low-traffic areas are defined as areas of at least 100 km^2 in size (ULTA ≥ 100 km^2) that are not fragmented by transport networks. Transport routes are only deemed to dissect the landscape if they exceed a certain traffic volume.

The concept of undissected low-traffic areas provides a good quantitative measure of large-scale landscape dissection. It does not, however, allow detailed conclusions to be drawn regarding the function, quality and dissection of individual habitats within identified undissected low-traffic areas. As such areas are located in less densely settled landscapes with less transport infrastructure, when compared to highly dissected areas they are affected to a lesser extent by permanent traffic-related emissions such as noise. They can also indicate a greater near-natural status. The absence of dissection and traffic-related disturbance is essential for the occurrence of many species and for biodiversity conservation.

[Margin column: The indicator represents the extent of dissection in relation to the total area of the landscape.]

Indicator

The indicator measures the degree of landscape dissection in Germany by transport networks at landscape scale (1 : 250,000). There are two approaches to measuring landscape dissection that are used for two different sub-indicators. The first sub-indicator states the total sum of undissected, low-traffic areas (ULTA) with a minimum size of 100 km^2 as a percentage of the total land area of Germany. The second sub-indicator states the effective mesh size (M_{eff}), which is a measure of the average degree of landscape dissection expressed as the mesh size of an imaginary regular grid that exhibits the same degree of dissection as the area under analysis. Consequently, M_{eff} can also describe the degree of fragmentation and depict gradual changes in the dissection of already heavily fragmented landscapes.

In the National Strategy on Biological Diversity, the Federal Government has set a target of holding constant the current proportion of undissected, low-traffic areas of at least 100 km^2 in size. As no

figure is available for 2007, the year the strategy was adopted, the figure for 2005 (25.4 percent) is used for the target instead.

[Margin column: "The current proportion of undissected, low-traffic areas of ≥ 100 km² will be retained." (BMU 2007: 52)

Composition

Data on transport routes is taken from the national Digital Landscape Model (DLM 250). In addition, traffic census data from the Federal Highway Research Institute (BASt) and the German Länder (states) was supplemented by model-based traffic loads for the entire road network in the 2010 survey. Dissecting transport axes are defined as roads (federal motorways, federal roads, state roads and district roads) with traffic volumes upwards of 1,000 motor vehicles per day, multiple-track or electrified single-track railway lines, and German federal waterways (Class IV or higher). The subject of analysis is the dissection of the German land surface by these transport axes. Settlements and airports with an area in excess of 93 ha are also treated as dissecting barriers. The result is a determination of the location, number and total area of all areas that constitute undissected low-traffic areas of at least 100 km² in size.

Assessment

Indicator values are available for the four years 2000, 2005, 2010 and 2015. The assessment shows that in 2015, the share of undissected low-traffic areas in Germany is within the target range and has increased slightly from 23.2 percent in 2010 to 23.5 percent. However, it still remains below the target value of 25.4 percent. The increase in undissected low-traffic areas in 2015 is largely methodology-related, because the modelled traffic volumes on Länder (state) and district roads frequently vary either side of the threshold of 1,000 vehicles per day. The effective mesh size (M_{ef}) decreased in 2015 to 80 km² and shows that further dissection has occurred, most notably in ULTA < 100 km². The loss of undissected low-traffic areas from 2010 is largely a result of a change in the underlying data used. Due to the change in the dissection criteria and the differing data used for traffic volumes in 2000, 2005 and 2010/2015, the values in the time series are only comparable to a limited extent. The indicator values for 2015 are, however, fully comparable with the values from 2010, as they are based on the same dissection criteria and also on complete traffic volume data (extrapolations).

Germany has a well-developed transport infrastructure and, consequently, the focus of future investment spending will be on maintaining the infrastructure in place. The current Federal Transport

Infrastructure Plan 2030 has for the first time focused on limiting additional land use and avoiding further loss of undissected areas in order to limit the use of nature and landscape.

For the conservation of biodiversity, it is essential to avoid further fragmentation of ecological networks[3] and to remove existing fragmentation. Ensuring sufficient ecological permeability is already standard practice when building and upgrading federal transport routes. Wildlife crossings in the form of bridges and tunnels are generally provided where there is a proven need.

As they consider transport routes as a whole, neither of the currently existing sub-indicators (ULTA and M_{eff}) can take individual crossing aids into account. Consequently, the Federal Government's many efforts to avoid fragmentation or to reconnect the landscape are not adequately reflected. An additional sub-indicator is needed as a result. This sub-indicator should cover the BfN's ecologically derived habitat networks and corridors[3] as well as the undissected functional areas; thus, unlike with the first two sub-indicators, it is now possible to include the ecological quality of the areas in the assessment.

Under the provisions of the National Strategy on Biological Diversity, an initial proposal was developed for this new sub-indicator for ecological network dissection and reconnection as part of a BfN research project. The new sub-indicator should make it possible to describe both the current state of fragmentation of Germany's ecological networks and the success of habitat reconnection with corresponding measures. The Federal Reconnection Programme adopted by the Federal Cabinet in 2012 provides the policy basis in developing this new sub-indicator. The success of the programme is to be presented in regular reports using the new indicator.

[Margin column: In action area C9, 'Settlement and transport', the German federal government committed to a wide range of measures (BMU 2007), including:

Anchoring of the concepts 'undissected low-traffic areas' and 'habitat corridors' together with noise abatement in strategic environmental assessment for traffic route plans

Development of nature conservation standards to assess considerable impairments to biodiversity via effect factors, particularly transport route planning

Development of a nationwide concept to protect and restore undissected low-traffic areas

[3] Ecological networks (also known as habitat networks) are systems of similar habitats of particularly high conservation value and in geographical proximity that potentially display close functional relationships

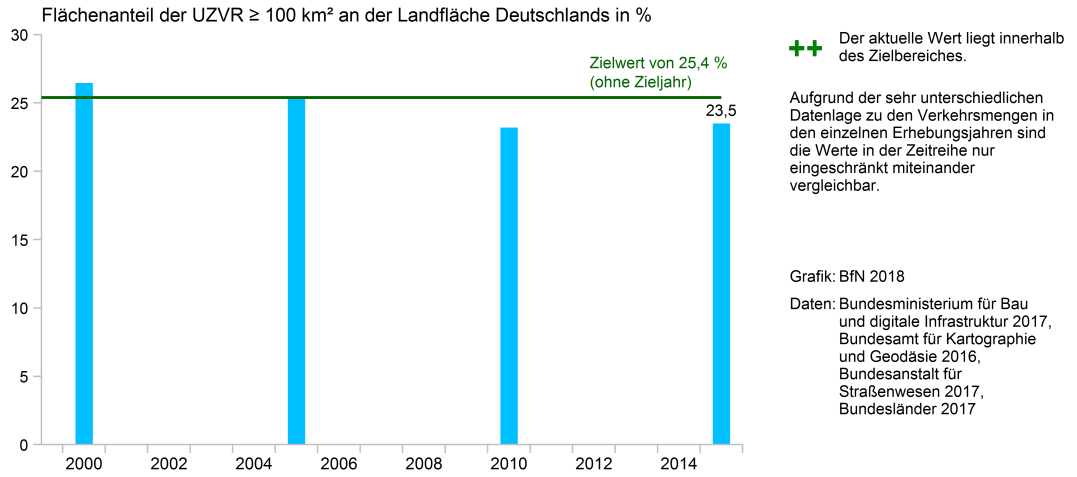
Conservation/restoration of connecting corridors to reduce the effects of dissection and to strengthen the network function

Consideration of interlinked habitat axes in national transport route planning projects

Development of a nationwide programme of measures on the topic of dissection/cross-linking

Continued development of the 'undissected low-traffic areas' indicator with due regard for European developments and regular documentation every five years

Landschaftszerschneidung



Thematic areas

B 2.8 Mobility, C 9 Settlement and transport

Definition

Proportion of undissected low-traffic areas with a minimum size of 100 km^2 as a percentage of German land area

Target

The proportion of undissected low-traffic areas with a minimum size of 100 km^2 remains as in 2005 (25.4 percent).

Core assessment

The proportion of undissected low-traffic areas with a minimum size of 100 km^2 decreased from 26.5 percent to 23.5 percent between 2000 and 2015. In the same period, the effective mesh size (M_{eff}) decreased from 84 km^2 to 80 km^2. Germany has a well-developed transport infrastructure and, consequently, the focus of future investment spending will be on maintaining the infrastructure in place.

2.3 Economic activities

2.3.1 Agri-environment-climate measures

Farmland offers habitats for numerous animal and plant species typical for the open countryside. This calls for forms of land use that meet the needs of the respective animals and plants. Many species that depend on extensive forms of agriculture are undergoing sharp population declines as agriculture intensifies at rates that vary from region to region and as agricultural use continues to be abandoned in marginal areas.

Under the second pillar of the Common Agricultural Policy (CAP), the European Union provides funding from the European Agricultural Fund for Rural Development (EAFRD) to support, among other things, agri-environment and climate measures[4] (AECMs; until 2013 agri-environment measures/AEMs). These measures are aimed, among other things, at the conservation and promotion of biodiversity, soil protection and the improvement of soil structure, the reduction of emissions and fertiliser and pesticide inputs as a contribution to environmental and climate protection and to animal welfare.

In Germany, planning and management of such programmes of measures is the responsibility of the German Länder (states). Funding is either provided under the Länder funding programmes, although individual measures can be co-financed by the Federal Government under the Joint Programme on Improving Agricultural Structure and Coastal Protection" (GAK) or by the EU, and the national share can also then be partially further co-financed via the GAK. The requirements for AECMs must go beyond the mandatory requirements which apply under the first pillar of the CAP, i.e. cross-compliance provisions (mandatory statutory management requirements (SMRs) and maintenance of land in good agricultural and environmental condition) and greening requirements (maintenance of permanent pasture, crop diversification and establishment of organic priority areas), as well as the mandatory minimum requirements under national legislation. Payments for the funding measures may only cover the additional expense and loss of income associated with the enhanced farm management requirements, subject to avoidance of double subsidies.

Alongside AECMs, the EAFRD Regulation also contains additional co-financing options for the conservation and enhancement of biodiversity. These options include Natura 2000 compensatory payments, support for non-productive investments, and measures to conserve and enhance rural heritage. Measures to conserve genetic resources, i.e. for the conservation of local endangered

[4] Climate measures aim to combat climate change and assist adaptation to its effects.

animal breeds or regionally adapted traditional crop species and varieties threatened by genetic erosion, can also be promoted. However, estimating the funds explicitly used for biodiversity is extremely complex and is only possible to a certain extent: the measures frequently have multiple goals, with biodiversity conservation targeted alongside environmental protection (such as soil conservation) and/or climate protection. For this reason, the indicator so far includes all AECM measures.

[Margin column: The indicator provides information about subsidies for agri-environmental and agri-environment-climate measures in farming.]

[Margin column: Financial resources for agri-environmental measures are intended to promote inter alia traditional and environmentally sound forms of agriculture that sustain nature (BMU 2007: 73).

Indicator

The indicator assesses the total area of land on which agri-environmental measures and from 2014 agri-environment-climate measures are conducted and the amount of funding granted for the purpose. Conserving and enhancing biodiversity in the cultural landscape is a fundamental aim of agri-environmental programmes and an objective of the National Strategy on Biological Diversity (NBD). In this respect, wider use of AECMs (area and resources spent) is thus suited in supporting the objectives of the NBD.

Composition

Data on the area of agricultural land on which AECMs are promoted as well as data on EU, national and Länder subsidies for that purpose is compiled by the German Federal Ministry of Food and Agriculture (BMEL). Since 2007, in accordance with EU requirements, the German Länder have reported actual payments rather than the financial resources made available as in previous funding periods.

For the current funding period starting in 2014, no consolidated data on AECMs is available for the years 2014 and 2015. Due to changes in EAFRD reporting obligations, that data cannot be evaluated by BMEL on the basis of the reports published by the German Länder as was previously the case. 2014 and 2015 were the transition years between the CAP funding phases. In those years, a survey involving a reasonable amount of effort was not feasible, as comparable data was not collected and reported by the Länder and the changeover to the new funding phase took place at a different time in each German state and possibly differently for different measures. The Federal Office for Agriculture and Food (BLE) conducted a data survey of the German states to obtain the

figures for 2016 and 2017. This means that data from 2016 onwards is only comparable with previous years to a limited extent.

Assessment

In the new funding period from 2014 onwards, the total area funded declined considerably. One reason is that various measures with a large area coverage but comparatively low effectiveness were no longer offered by the federal and state governments (e.g. over 1 million ha of crop rotation measures and measures to promote the application of liquid manure have expired). At the same time, funding for more demanding measures was better aligned to actual costs (e.g. an increase in funding for the introduction and maintenance of organic farming methods). Overall, funds spent on AECMs were significantly increased. In addition, measures to conserve biodiversity were added to the 2014 GAK framework plan and the funding opportunities for measures concerning contract nature conservation and landscape management were expanded in the course of the 2017 and 2018 GAK framework plans as a result of a corresponding amendment to the Act on a Joint Task for the Improvement of Agricultural Structures and Coastal Protection (GAK Act) in 2016.

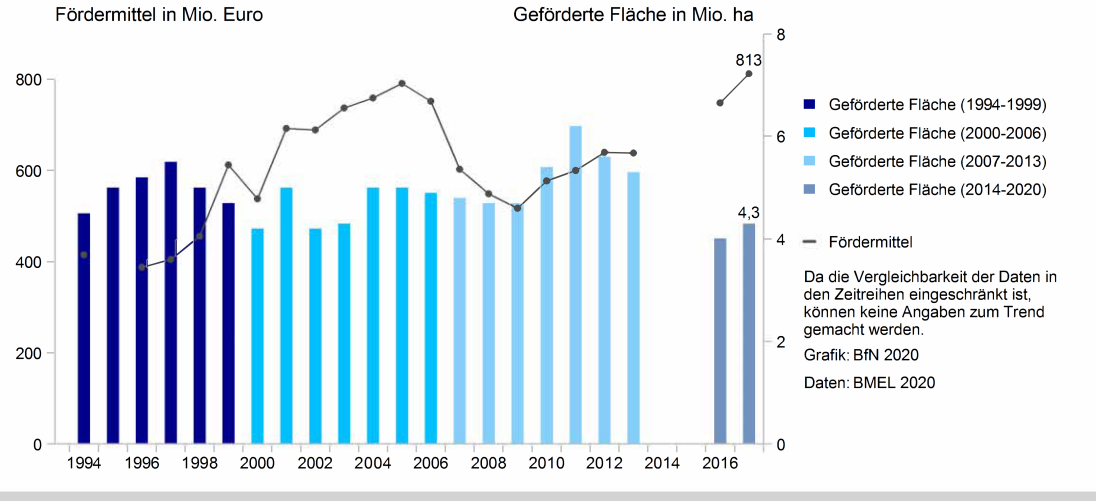
As a general rule, fluctuations in funding activity are influenced to a considerable extent by the funding periods of EU agricultural funding. Experience shows that commitments decline both towards the end and at the beginning of a funding phase and increase in the period in between. At the beginning of a new funding phase, other requirements for farms and administrations are often at the forefront – in 2014, the introduction of greening – and new AECM contracts are thus not entered into initially. Agri-environmental measures must also be adapted to the new legal provisions and needs at the beginning of a new funding phase.

Looking at the distribution of EAFRD funds in Germany and the funds for national co-financing for the period 2014 – 2020, the most significant share, around 20 percent of the total funds, is earmarked for the implementation of AECMs. However, these are only projected/budget figures, which can deviate significantly from the actual payments made. To maintain or increase biodiversity in the agricultural landscape, sufficient funding and correspondingly high use of funding also play an important role in national implementation of the Common Agricultural Policy.

[Margin column: The National Strategy on Biological Diversity identifies the following measures for implementation in farming and forestry (BMU 2007: 73):
At EU/national level: "Review of agricultural and environmental policy measures with a view to sustainability and financially viable opportunities to further improve nature compatibility within the context of EU agricultural support and national/European agricultural and environmental policy"

At Länder/municipal level: "More widespread promotion of traditional and eco- and nature-friendly forms of agriculture and forestry"

Agrarumwelt- und Klimamaßnahmen



Thematic areas

B 2.4 Agriculture

C 6 Agriculture and silviculture

Definition

Total area over which agri-environmental measures (from 2014 agri-environment-climate measures) were conducted and the associated funding granted

Qualitative target

Promotion of traditional, environmentally sound and nature-compatible forms of agriculture with the objective of significantly enhancing biodiversity in the agricultural landscape

Core assessment

In the new funding period from 2014 onwards, as of 2016 the considerably increased funding was concentrated on considerably fewer funded areas. This is the result of cost-intensive measures that can be assumed to have a greater positive effect on the agri-environment.

2.3.2 Organic farming

Some 51 percent of the German land area is agricultural land. Farmland biodiversity is heavily dependent on farming methods. Improvements in species and habitat conservation in the agricultural landscape can only be attained with more environmentally sound farming practices sustaining nature.

Organic farming makes a valuable contribution towards conserving biodiversity and maintaining regionally characteristic cultural landscapes. Among other things, organic cultivation fosters biological activity in the soil, protects soil structure and reduces soil loss. Increased soil water retention capacity additionally aids flood control, and the threat of soil erosion decreases. Reduced use of veterinary drugs and relinquishment of easily soluble mineral fertilisers and synthetic chemical plant protection products help protect groundwater and surface waters, and promote diversity. The objective of organic farming is to cultivate the land using as far as possible closed nutrient cycles so as to conserve energy and other resources, avoid harm to the environment and the climate, and reduce nutrient pollution of water and soil. In its Sustainability Strategy, the Federal Government thus sees organic farming as essential in achieving its agricultural policy vision.

The ‘Organic farming’ indicator was developed for the National Sustainability Strategy and incorporated into the National Strategy on Biological Diversity. It is thus also regularly reported in the indicator reports published under the National Sustainability Strategy, most recently in the Indicator Report 2018 (STATISTISCHES BUNDESAMT 2018). The indicator has also found its way into the indicator set developed by the Länder Initiative on Core Indicators (Länderinitiative Kernindikatoren, LIKI).

[Margin column: The indicator provides information about the area of organically farmed land that contributes towards the conservation of biodiversity.]

Indicator

The ‘Organic farming’ indicator reports the area of organically farmed land belonging to agricultural holdings subject to the control system under EU legislation on organic farming. It is reported as a percentage of the total agricultural land area and includes both land fully converted to organic farming and land still in the process of conversion. In the coalition agreement for the 19th legislative period, the Federal Government set the goal, based on the National Sustainability Strategy, of further expanding organic farming along the entire value chain to increase the proportion of land under organic management to 20 percent by 2030. In line with the goal set out in the coalition agreement, when updating the National Sustainability Strategy in 2018 for the ‘Organic farming’ indicator, the

target of increasing the share of organic farming to 20 percent, which had previously been pursued without a target year, was linked to the target year 2030.

Composition

The data on organic farming is compiled by the Federal Office for Agriculture and Food (BLE) on behalf of the Federal Ministry of Food and Agriculture (BMEL) and by the Federal Statistical Office. The indicator is calculated from data provided by the Federal Statistical Office. The data is based on the results of agricultural statistical surveys. The information on the areas mostly refers to the month of May of the year in question. In the surveys, coverage limits are applied in order to exempt small farms from the obligation to provide information and to minimise the effort involved in collecting data. The BMEL results are based on the data provided by the Länder as of 31 December of the respective year and include all areas subject to the inspection procedure for organic farming in accordance with the EU Eco-Regulation.

Land is considered to be organically farmed if an agricultural holding produces plant or animal commodities in accordance with the principles of Council Regulation (EC) No 834/2007 on organic production and labelling of organic products and the associated implementing rules. Farms must also be subject to a control system operated by a state-approved control body.

Assessment

In 1999, according to official statistics, organic farming was practised on 489,093 ha of land on 9,572 farms. This represented 2.9 percent of the total agricultural land area. These figures have risen continuously since 1999. In 2018, more than twice the amount of land, around 1.22 million ha, was farmed in accordance with organic farming regulations. This represented 7.3 percent of the total agricultural land area. The number of organic farms has also increased by about 12 percent, to almost 32,000 farms. Growth rates are thus above 10 percent for the third consecutive year, and the positive trend continues. For methodological reasons (see Composition), the annual data provided by the Federal Ministry of Food and Agriculture shows a slightly higher share of 9.1 percent or 1.52 million ha for 2018. In 2018, most of the organic land in Germany was used as permanent grassland 54.8 percent), arable land accounted for 43.5 percent and other crops (including fruit) for only 1.7 percent. From 2007 to 2018, a statistically significant positive trend was evident and the increase in area in 2016 and 2018 was significantly higher than in previous years. Nonetheless, the current indicator value is still very far from the target value.

According to the Statistical Office of the European Union (Eurostat), a total area of 13.4 million ha was cultivated organically in the EU-28 states in 2018. In relation to the agricultural area of the

individual EU states, as in previous years, in 2018 the highest share of organic farming area was recorded for Austria (24.1 percent), followed by Estonia (20.6 percent), Sweden (20.3 percent), Italy (15.2 percent) and the Czech Republic (14.8 percent).

Reasons for the relatively minor increase in organically farmed land in Germany can be found among other things in competition for leased land and lease prices, partly to do with the cultivation of biomass crops for biogas installations. By way of contrast, demand for organic food products continues to grow a pace. Germany is the biggest organic produce market in Europe and the second-largest in the world. Sales of organic products rose above €10 billion for the first time in 2017 (according to Agrarmarkt Informationsgesellschaft, AMI) and reached €10.91 billion in 2018. In 2018, Germans spent 5.5 percent more on organic food and beverages compared to 2017. The organic share of the total food market thus increased from 5.2 percent in 2017 to just under 5.3 percent in 2018.

The decision to convert to organic farming lies with individual farms. The Federal Government is committed to further strengthening organic farming and to giving incentives for interested farmers to switch to and retain organic farming practices. GAK payments (standard rates) for switching to and retaining organic farming practices were thus increased for the most part in 2015. The GAK rules permit the standard rates to be both increased and decreased by up to 30 percent to give the Länder sufficient freedom in national co-financing.

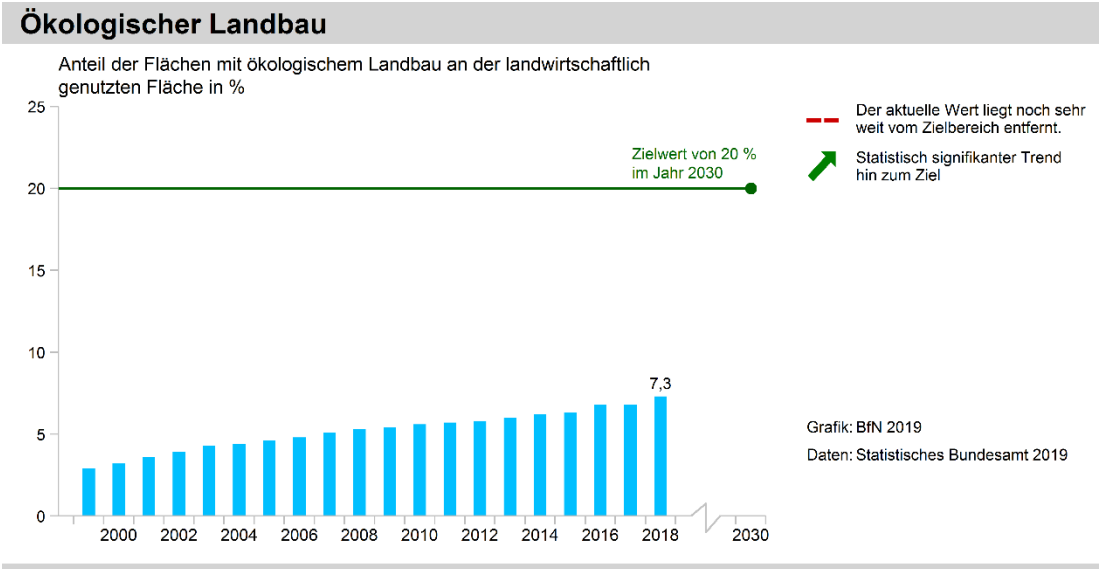
Since 2001, the Federal Ministry of Food and Agriculture (BMEL) has been funding research projects as well as information, education and promotional measures on organic farming and organic food production as part of the Federal Programme for Organic Farming and Other Forms of Sustainable Agriculture (BÖLN). Originally conceived as a support programme exclusively for organic farming, the federal programme was opened up to other forms of sustainable agriculture in 2010 following a German Bundestag resolution. For 2020, the programme has a budget of around €29 million.

In an 18-month participatory process, BMEL developed the Strategy for the Future of Organic Agriculture (ZöL), working with the organic food and farming sector, and with the involvement of the science and research community and administrations at federal, state and municipal level. The strategy was officially presented in February 2017 and has been implemented as part of an ongoing process ever since. With a wide range of measures, instruments and projects identified in collaboration with various experts, the organic sector is to be strengthened and made ready for further

positive market development. The measures range from the strengthening of value chains to advisory services and vocational training, boosting the organic share in out-of-home catering, promoting research and ensuring sufficient funding for conversion and retention bonuses.

[Margin column: The Federal Government wants to further expand organic farming, in order to achieve an area share of 20 percent by 2030 (FEDERAL GOVERNMENT2018: 45)].

Note regarding the chart: The Federal Statistical Office figures are considerably lower than the data collected by the Länder. Because BMEL always refers in its communications to the values reported by the Länder, these figures are also shown here. The table containing these values is attached as an annex.



Thematic areas

B 2.4 Agriculture

C 6 Agriculture and silviculture

Definition

Area of organically farmed land as a percentage of the total agricultural land area

Target

Organically farmed land area to increase to 20 percent of the total agricultural land area in 2030

Core assessment

The proportion of organically farmed land area has increased continuously since 1999 (7.3 percent in 2018). However, the 20 percent target is far from being reached. Based on the Strategy for the

Future of Organic Farming, the Federal Government will further expand organic farming in order to increase the share of land to 20 percent by 2030.

2.3.3 High nature value farmland

Farmland biodiversity has decreased significantly in the past 50 years as a result of changes in farming practices, particularly due to the use of increasingly efficient agricultural techniques. To counter this loss, the EU supports rural development measures, among other things, with the aim of enhancing the quality of the landscape and the environment. Support for rural development in EU member states is governed by the EAFRD Regulation (European Agricultural Fund for Rural Development, EAFRD).

The 'High nature value farmland (HNV farmland)' indicator is one of a number of baseline indicators newly introduced in the context of European support programmes for rural development (EAFRD). EU member states are required to collate and report data for the indicator on a regular basis. In Germany, this obligation applies both to the Federal Government and to the Länder. The purpose of the indicator is to help in assessing both the impacts of farming on biodiversity and progress made in promoting biodiversity in agricultural landscapes. To provide the data needed, agricultural areas and structural elements typical of agricultural landscapes have been mapped on sample areas since 2009 in a monitoring project coordinated by the Federal Government and carried out by the Länder using a standardised recording and assessment method. The area proportions determined are extrapolated for the agricultural area at national level. For this purpose, the proportion of areas with high nature value (in ha) is regularly determined and classified into quality levels.

[Margin column: The indicator provides information on the area of high nature value farmland (HNV farmland) that contributes towards the conservation of biodiversity.

Indicator

The indicator reports the area of high nature value farmland (HNV farmland) as a percentage of the total farmland area. HNV farmland comprises extensively farmed, species-rich grassland, arable land, sparse orchards, vineyards, and fallow land. Structurally rich landscape elements such as hedges, field margins, field copses and small water bodies that form part of the farmed cultural landscape are also given the status of high nature value. Plots and landscape elements are classified using a fixed system of quality criteria. HNV farmland is subdivided into land with exceptionally high, very high or moderately high nature value.

In the National Strategy on Biological Diversity, the area share of HNV farmland is targeted to increase by at least ten percentage points from 2005 to 2015. As monitoring only started in 2009, the 2009 figure is taken as the starting value. Assuming a linear trend up to 2019, the target value

was an increase of at least six percentage points to a share of at least 19 percent of agricultural land by 2015.

[Margin column: Council Regulation (EC) No 1305/2013 of 17 September 2013 governs support for rural development by the European Agricultural Fund for Rural Development (EAFRD). The EAFRD Regulation is supplemented by rules for its application set out in Commission Regulation (EC) No 808/2014 of 17 July 2014.]

Composition

HNV farmland is monitored nationwide in a representative sample on areas measuring one square kilometre. The same plots are used for the monitoring of breeding birds, providing data among other things for the 'Species diversity and landscape quality' indicator (see Section 2.1.1). After the first overall survey in 2009, partial surveys have been conducted annually since then, meaning that a full survey round is completed within a period of four years. Three Germany-wide surveys have thus been completed so far. The indicator value is updated every two years for reporting purposes, with the data from the last four years being used (four-year rolling average).

The survey involves inspecting all farmland in each sample plot. Areas and structural elements to be classified as HNV farmland according to the uniform national survey key are included with their area type and assessment, and the areas are stored in a geographic information system. From the sample, the area of HNV farmland and of each of the three value classes is extrapolated for the whole of Germany and for each of the Länder, expressed as a percentage of the total farmland area. The latter is determined using the Official Topographic and Cartographic Information System (Amtliches Topographisch-Kartographisches Informationssystem, ATKIS).

Assessment

The 2017 survey returned an indicator value of 11.4 percent for the proportion of HNV farmland area relative to the total farmland area. Thus, the value has hardly changed compared to 2015, but is a statistically significant 1.7 percentage points lower than in 2009. Some 2.4 percent of the agricultural land was classified as land of exceptionally high nature value, 4.4 percent as land of very high nature value and 4.7 percent as land with moderately high nature value. The proportion of areas with exceptionally high nature value or very high nature value changed only slightly compared to 2009. In contrast, agricultural land with a moderately high nature value showed a continuous decrease by a total of 1.6 percentage points from 2009 to 2017 due to more intensive farming. The declines are largely limited to the actual areas farmed (extensively farmed grassland, arable fields

and species-rich fallow land), while the proportion of structurally rich landscape elements declined to a much lesser extent and not at all since 2013.

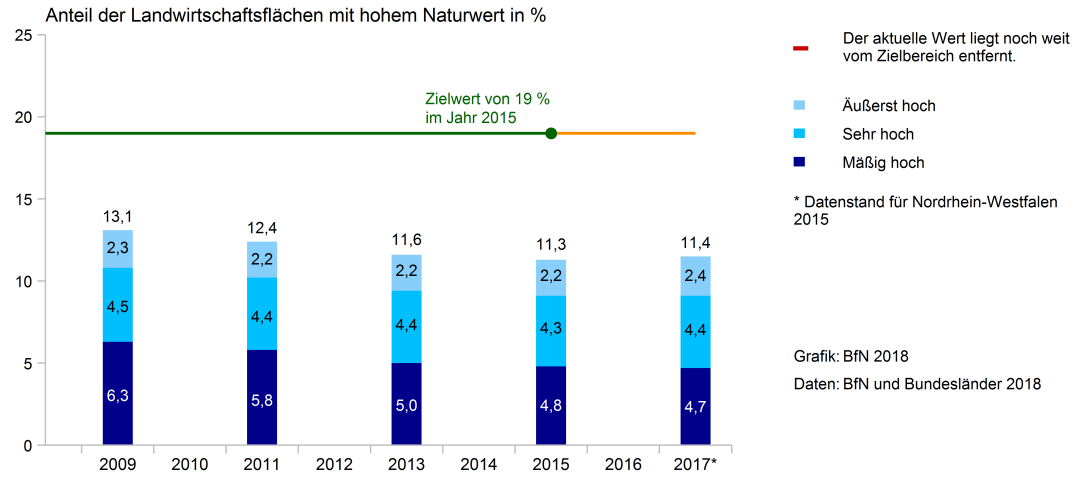
To still reach the target value set for 2015, greater and targeted efforts must be made. The measures taken should include:

- Retention of the rules on avoiding grassland conversion
- Extensification of farming intensity on suitable grassland
- Establishment of extensively farmed or uncultivated buffer strips around landscape elements and arable land
- Keeping fields with low-fertility soils fallow under targeted fallow land management
- Incorporation of extensively farmed land (including fallow land managed for nature conservation purposes, wild-flower strips, and buffer strips alongside near-natural habitats) into productive conventional and organic farming systems.

Farmers should be compensated for any financial losses. For this purpose, funds are provided for contracted nature conservation measures or agri-environmental and climate measures to safeguard species-rich, agriculturally shaped open land habitats and environmentally and nature-compatible forms of production in agriculture. However, in the new funding period (CAP post-2020), the funding currently available should be increased and schemes designed to increase the share of HNV farmland to at least 19 percent of agricultural land.

[Margin column: "By 2015, the proportion of land used for valuable conservationist agro-biotopes (high-grade grassland, orchard meadows) has increased by at least 10% compared with 2005. In 2010, semi-natural landscape elements (such as hedges, borders, field shrubbery and small bodies of water) account for at least 5% of agricultural areas." (BMU 2007: 47)

Landwirtschaftsflächen mit hohem Naturwert (High Nature Value Farmland)



Thematic areas under the National Strategy on Biological Diversity

B 2.4 Agriculture, C 6 Agriculture and silviculture

Definition

Area of high nature value (HNV) farmland as a percentage of the total farmland area

Target

The objective is to increase the area of HNV farmland to 19 percent of the total farmland area by 2015.

Core assessment

In 2017, exceptionally high, very high and moderately high nature value farmland area accounted for 2.4, 4.4 and 4.7 percent of the total farmland area respectively (adding up to an 11.4 percent share for HNV farmland area as a whole). To attain the target by 2015, specific action must be taken to promote biodiversity in agricultural landscapes and particular attention should be paid to the areas of moderately high nature value.

2.3.4 Genetic diversity in agriculture

The genetic diversity of crops and livestock is an essential basis and a valuable resource for future uses and innovations. It plays a role in securing our supplies of food and raw materials. Crop and livestock diversity along with knowledge about cultivation, breeding and use are also an important part of our cultural heritage. In the course of globalisation of markets and the concentration processes in farming and the food industry, a wide range of cultivated plant species and varieties have disappeared from large-scale cultivation. This represents an impoverishment of historically evolved cultural landscapes and a loss of valuable genetic potential for breeding purposes. With regard to livestock, regional landraces have made way for a small number of globally farmed breeds. The National Strategy on Biological Diversity and the sectoral strategy on agrobiodiversity thus include a goal of conservation and sustainable use of regionally characteristic genetic diversity of animal breeds and crop plant varieties.

For this purpose, the Federal Government, the Länder and other stakeholders have launched national programmes for plant, animal, aquatic and forest genetic resources. The National Programme for Conservation and Sustainable Use of Animal Genetic Resources in Germany (TGR Programme) was adopted by the Conference of Agricultural Ministers in 2003. The programme provides guidance for a coordinated approach by all involved. It includes measures relating to cattle, pigs, sheep, goats, horses, rabbits and poultry.

[Margin column: Margin column: *The indicator reports threats to genetic resources in agriculture using the example of selected indigenous farm animal breeds.]*

Indicator

The ‘Genetic diversity in agriculture’ indicator assesses the extent of threats to animal genetic resources in agriculture. It is compiled by aggregating endangerment data for breeds of livestock species regulated under zootechnical legislation (horse, cattle, pig, sheep and goat) according to the Red List of Germany’s Endangered Indigenous Farm Animal Breeds. For this purpose, the TGR Programme specifies threat categories comprising a graded scale of endangerment levels.

In the National Strategy on Biological Diversity, the Federal Government pledges to safeguard endangered farm animal breeds. The total number of indigenous farm animal breeds is to be prevented from falling. This leads to an objective of reducing the overall level of endangerment to farm animal breeds.

[Margin column: "The regional-typical genetic diversity of farm animal breeds and cultivated plant varieties is conserved, utilised sustainably, preserved as a basis for life and breeding, and enriches the landscape and the range of agricultural and horticultural products." (BMU 2007: 30)]

Composition

The underlying data consists of population statistics on each livestock breed provided by breeder and herd book organisations. These are collated by the Information and Coordination Centre for Biological Diversity (Informations- und Koordinationszentrum Biologische Vielfalt, IBV) at the Federal Office for Agriculture and Food (Bundesanstalt für Landwirtschaft und Ernährung, BLE) in the Central Documentation of Animal Genetic Resources in Germany (Zentrale Dokumentation Tiergenetischer Ressourcen in Deutschland, TGRDEU). The indicator is compiled from the classifications of breeds in the Red List using the threat categories drawn up under the National Programme on Animal Genetic Resources (BLE 2008, 2010, 2013, 2015, 2018).

The categories are as follows:

(1) Phenotypic Conservation Population (PCP) for breeds that merely survive as remnants in zootechnical terms but whose cultural value is undisputed
(2) Conservation Population (CP) for highly endangered populations
(3) Monitoring Population (MP) for endangered populations
(4) Non-endangered breeds (NE)

A breed's endangerment is measured by the effective population size. This is determined according to the specifications of the TGR Programme. The classification of breeds into endangerment categories is performed by the Advisory Board for Animal Genetic Resources.

The indicator shows the percentage share of endangered indigenous horse, cattle, pig, sheep and goat breeds. The total number of assessed breeds can vary over time as new breeds are added or other breeds die out or when the delineations between breeds are changed. New breeds – mostly horses – were thus included in the assessment from 2011. As a result, the endangerment of all indigenous livestock breeds was assessed in the Red List for the first time starting in 2011. Certain cases justify a deviation from the classification into Red List endangerment categories according to effective population size. This can apply, for example, if a breed has had a very small population size over multiple generations. Such decisions are reviewed in the subsequent monitoring cycle.

[Margin column: The term "indigenous" is defined under Article 2 (11) of the German Animal Breeding Act (Tierzuchtgesetz): "A breed is defined as indigenous if in respect of breeds in Germany
a) the original herd book was established in Germany and has been maintained there ever since, or for herd books established earlier, the herd book has been maintained in Germany since 1949
b) if the original herd book was not established in Germany but the only herd book for the breed is now maintained in Germany and a breeding programme is conducted there, or
c) if the original herd book was not established in Germany, but a herd book has been kept at least since 1949 on the basis of existing livestock in Germany and for which an independent breeding programme has been carried out."]

Assessment

The indicator shows the percentage of endangered indigenous horse, cattle, pig, sheep and goat breeds to be very high, at over 70 percent in 2017. However, the proportion of particularly endangered livestock breeds in the endangerment category conservation population is steadily decreasing. The total number of breeds evaluated has increased considerablycompared to 2006. While 64 breeds were initially evaluated in 2006, a total of 77 breeds were included in the evaluation in 2017.

Although the endangerment categories used in the data series remained basically the same, the criteria for assigning breeds to the categories were changed as of the 2011 survey year, so that some breeds were moved to a different category for methodological reasons. In addition, subpopulations previously been considered separately were combined into breed groups or specific breed groups were divided into independent breeds. This means that the indicator values for the years 2006 and 2008 are only comparable with the data points for the following years to a limited extent.

The in some cases substantial redistribution of breed numbers among the categories between 2008 and 2011 is only partly due to the effectiveness of the conservation programmes. From 2011 to 2017, the classification of six breeds improved from "conservation population" to "observation population". The expansion of the payment scheme for endangered livestock breeds granted in line with the agri-environment-climate measures and certain targeted projects have had a noticeable supporting effect. In addition, regional livestock breeds benefit from the growing consumer interest in authentic, regional products. However, in the same period, one breed was downgraded from "observation population" to "conservation population". Also, the division of one breed group into separate independent breeds led to an increase in the number of livestock breeds in the "observation population" category. Despite these positive developments, the number of endangered livestock breeds is still too high.

	2006*	2008*	2011	2013	2015	2017
Category	**Number of livestock breeds**					
NE	10	11	22	23	22	23
MP	17	20	29	32	36	36
CP	24	23	18	15	14	13
PCP	13	11	5	5	5	5
Total	64	65	74	75	77	77

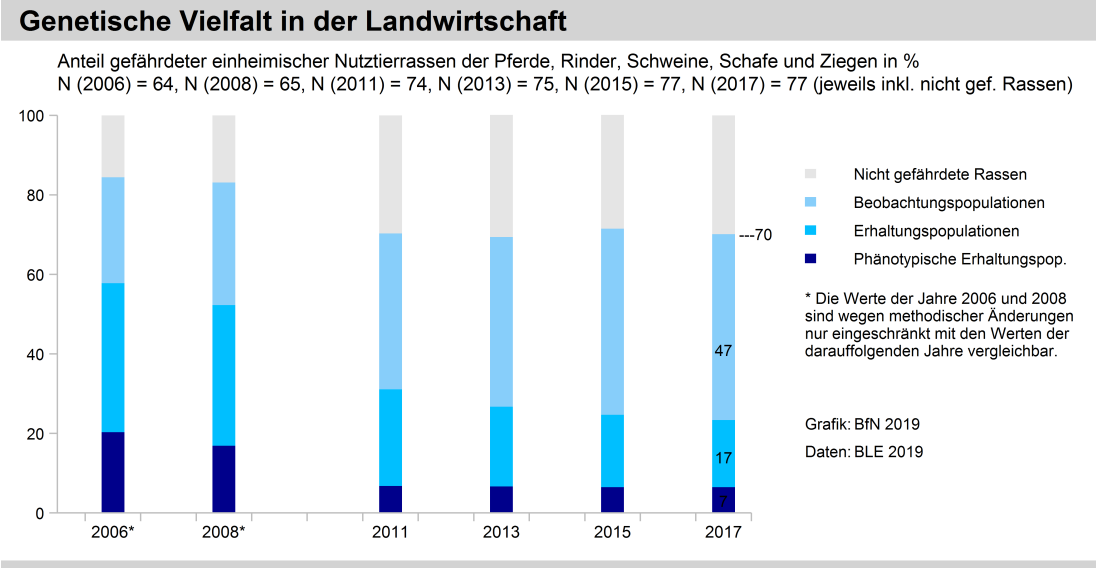
* Due to changes in methodology, the figures for 2006 and 2008 are only comparable with those of subsequent years to a limited extent.

Legend
NE: Non-Endangered Breeds
MP (Monitoring Populations): Endangered Populations
CP (Conservation Populations): Highly Endangered Populations
PCP (Phenotypic Conservation Populations): Breeds only surviving as remnants

The need for action varies considerably between the different farm animal species. The market potential of products from indigenous breeds plays an important role. Where horses and cattle are concerned, the potential for using indigenous robust breeds in landscape management and nature conservation remains largely untapped. Trends in milk production also influence whether the mostly endangered dual-purpose breeds are increasingly used on grassland farms. Thus, the challenge continues to lie in ensuring sustainable use and long-term conservation of indigenous breeds on a species-specific basis.

To consistently reduce the endangerment of indigenous livestock breeds, targeted measures such as the animal welfare payments from agri-environment-climate measures must be continued and efforts must be made to promote broader use of indigenous livestock breed diversity, e.g. in regional value chains, landscape management and nature conservation.

The situation regarding livestock can only be transferred to other areas, such as crops, to a very limited extent. For this reason, further indicators are currently being developed that will track plant genetic resources in addition to animal genetic resources and take developments at international level into account – for example, regarding the indicators for the United Nations 2030 Agenda for Sustainable Development.



Thematic areas under the National Strategy on Biological Diversity

B 1.1.4 Genetic diversity of wild and domesticated species

B 2.4 Agriculture, C 2 Species conservation and genetic diversity, C 6 Agriculture and silviculture

Definition

The indicator provides information on the extent to which genetic resources in agriculture are endangered, using the example of the livestock species horse, cattle, pig, sheep and goat, which are regulated under zootechnical law.

Qualitative target

Endangered farm animal breeds must be safeguarded. The overall level of endangerment to farm animal breeds must be reduced.

Core assessment

In 2017, the proportion of endangered indigenous breeds is very high at slightly over 70 percent. Specific action must be taken to reduce the threat situation.

2.3.5 Agricultural nitrogen surplus

Nitrogen is one of the most important plant nutrients. Through targeted, needs-based fertilisation and crop rotation, the nutrients removed from the soil during crop cultivation are replaced in order to secure both yields and the quality of harvested products, and to maintain soil fertility for the longer term. For reasons of economy, nature conservation and environmental protection, it is especially important to ensure efficient take-up of the nutrients spread in fertiliser. Under legislation governing their use, fertilisers must be applied in accordance with the principles of good farming practice. This means that the type, quantity and timing of fertiliser application must be attuned to the needs of crops and the soil. In the period from 2006 to 2016, 59 percent of the nitrogen spread on farmland came from mineral fertilisers and 41 percent from farm manure from livestock farming as well as from plant and animal fermentation residues from biogas production and other organic fertilisers. Farming, and especially livestock farming, contributes significantly to the input of nitrogen into ecosystems such as ground and surface waters and forests. This mainly occurs through leaching and run-off, and via the air pathway. The spreading of animal excrement and plant fermentation residues as farm manure, the storage of farm manure and keeping livestock in stables all produce ammonia emissions. Other sources contribute to nitrogen inputs, notably transport, industry and private households.

Excessive quantities of nitrogen entering the environment (such as from farming, transport, industry and private households) lead to far-reaching problems: groundwater contamination, excess nitrogen in inland waters, seas and terrestrial ecosystems (eutrophication), greenhouse gas emissions, and acidifying air pollution with its implications for the climate, biodiversity and landscape quality. Air pollutants also impact on human health.

As increasing concentrations of nutrients in inland and coastal waters show, diffuse inputs of nitrogen and other compounds are still too high, especially in regions with intensive agricultural land use and livestock farming. Agricultural nitrogen surpluses, especially in regions with high livestock densities, can contribute significantly to nitrate pollution of groundwater.

The nitrogen balance for agriculture (crop and animal production) serves as an indicator for the recording, analysis and assessment of agricultural sustainability in the broadest sense. It is part of the indicator set contained in the National Sustainability Strategy and was also recently reported in the Indicator Report 2018 published under the Strategy (STATISTISCHES BUNDESAMT 2018). The indicator is closely linked to the ‘Ecological status of surface waters’ and ‘Exceedance of critical loads for nitrogen’ indicators under the National Strategy on Biological Diversity.

[Margin column: The indicator provides information on the development of agricultural nitrogen surpluses.]

[Margin column: "Material discharges have significant effects on biological diversity because they alter the living and site conditions." (BMU 2007: 80)]

Indicator

The indicator provides information on the development of agricultural nitrogen surpluses. This allows conclusions to be drawn regarding potential pressures on environmental media and habitats. The indicator is calculated as an aggregate nitrogen balance for Germany as a whole. The degree of aggregation does not allow conclusions regarding regional surpluses.

[Margin column: "The calculated nitrogen surpluses are averages for Germany, and represent a yardstick of the potential discharges into groundwater, surface waters and the air." (BMU 2007: 131)]

The substances used in agricultural production, including nitrogen, cannot be fully utilised by crops. Agricultural production mostly takes place in open systems and over long cycles. Also, not all nitrogen compounds are available to crops in the same way. In addition, quantities of nitrogen remain on the field with crop residues, which are important for the humus content of the soil and thus for soil fertility, and are also included in the nitrogen surplus. For some crops (e.g. oilseed rape and vegetables) these residues can be significant. In the National Strategy on Biological Diversity, the Federal Government set a quantitative target of reducing annual net nitrogen surpluses in agricultural production to 80 kg/ha of farmland by 2010. Further reductions are aimed for by 2015. In 2016, the revised version of the National Sustainability Strategy set the goal of reducing nitrogen surpluses to an average of 70 kg/ha and year for the period 2028 to 2032.

[Margin column: In the 2016 version of the National Sustainability Strategy, the goal of reducing nitrogen surpluses to an average of 70 kg/ha and year was set for the period 2028-2032 (BUNDESREGIERUNG2017].

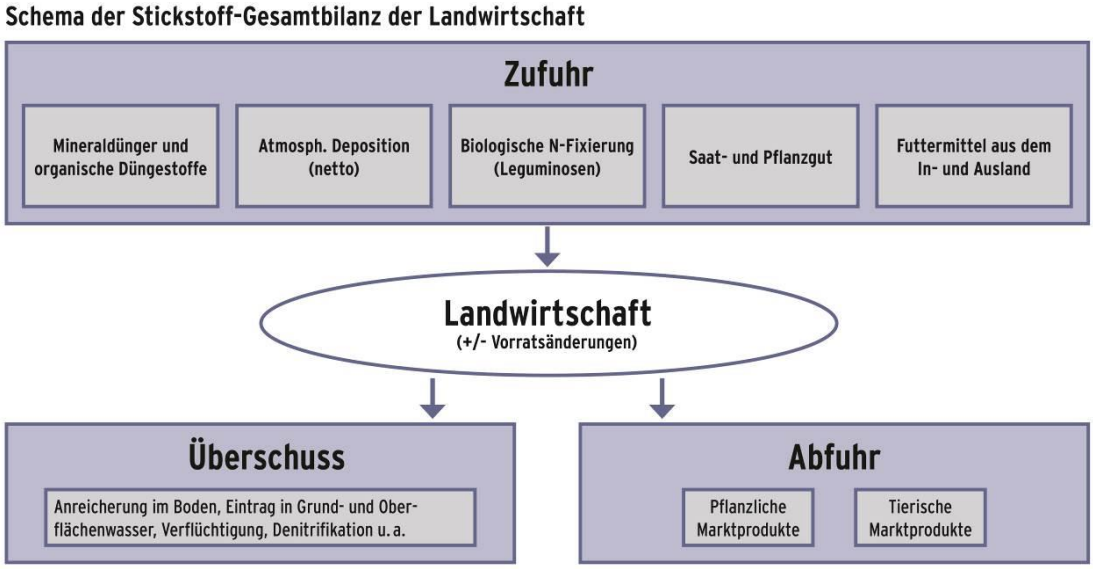
Composition

The indicator reports the overall net nitrogen surpluses for Germany in kg/ha farmland per year. It is calculated as the net sum of nitrogen inputs and nitrogen outputs (see figure below). The nitrogen inputs taken into account comprise nitrogen from fertiliser, non-agricultural emissions, biological nitrogen fixation, seed and propagating material, and from domestic and imported animal feed.

Nitrogen outputs consist of nitrogen in plant and animal market products. The aggregate surplus is computed on the basis of a 'farm gate' balance, meaning that nitrogen flows within the agricultural sector are not counted. The resulting annual nitrogen surpluses in kg/ha farmland are averages for Germany as a whole and do not allow an assessment of regional and farm-specific surpluses.

Important individual data sources include agricultural structure surveys of the German Federal Statistical Office and statistical yearbooks on food, agriculture and forestry compiled by the Federal Ministry of Food and Agriculture (BMEL). Variations in stocks and inventories at farm level (livestock, fertiliser, animal feed, etc.) are not included. Where exact survey data is not available (e.g. for gaseous losses), official calculations are used.

The primary time series for the indicator is a five-year rolling average, which is calculated from the total balance for the year in question and the two preceding and following years. This compensates for annual fluctuations that farmers cannot influence due to weather and market-related conditions.



Assessment

From 1992 to 2015, the annual nitrogen surplus fell by 19 percent, from 116 kg/ha to 94 kg/ha (five-year rolling average). While a statistically significant trend towards the target value of 70 kg/ha per year continues, the trend weakened in the period 2005 to 2015 and the current value still lies well above the target value. The sharp decrease in nitrogen surpluses seen early in the time series relates to reductions in livestock numbers in eastern Germany. The comparatively weak decline in the further course of the time series is based on a slight decrease in the use of mineral fertilisers and an increase in harvest yields due to technical progress in crop production and breeding (more

efficient nitrogen fertilisation, range of varieties) with a parallel expansion in the cultivation of high-yield crops (maize, wheat) as well as improved feed conversion in livestock. In 2017, fertilisers containing 55 percent (103 kg nitrogen per/ha and year) were the most important component of nutrient inputs in the overall balance. Domestic feed contributed 21 percent (40 kg/ha), foreign feed 12 percent (23 kg/ha), biological nitrogen fixation 7 percent (13 kg/ha), off-farm emissions 2.0 percent (4 kg/ha), seeds and seedlings 1 percent (1 kg/ha) and co-ferments 1 percent (2 kg/ha) to nitrogen inputs. While nitrogen inputs per ha reduced by about 11 percent between 1990 and 2017, nitrogen removals per ha increased to a far greater extent, by 40 percent between 1990 and 2017. In 2017, almost two-thirds of nitrogen discharge from agriculture was from vegetable products and one-third from animal market products.

To achieve the target of 70 kg/ha in the five-year average 2028 – 2032, it is necessary among other things to increase the efficiency of application of nitrogen fertilisers, take further measures to reduce nitrogen inputs and develop measures for more nitrogen-efficient feeding.

The 2017 amendment of the Fertilisation Act and the Fertiliser Application Ordinance will make an important contribution to the reduction of nitrogen inputs from farming. With the new regulations, stricter requirements now apply, among other things, to the application ceilings for organic fertilisers and the permissible area-based balance surplus. In addition, farms are required to develop fertiliser application plans in accordance with certain specifications. Also, the Farm Gate Balance Ordinance (Stoffstrombilanzverordnung) adopted in 2017 is intended to transparently calculate all material flows into and out of a farm so as to better control permissible nutrient surpluses. The amendments to the Fertiliser Application Ordinance following the ruling of the European Court of Justice (ECJ, Case C-543/16)[5] are expected to result in further reductions in the ‘Agricultural nitrogen surplus’ indicator.

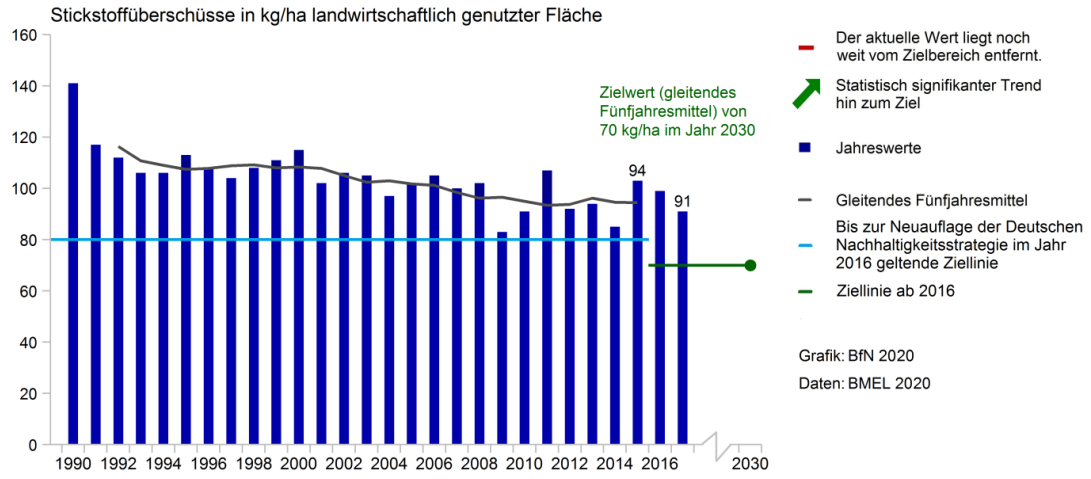
In the period up to April 2019, a national clean air programme was developed to implement the Directive on National Emission Reduction Commitments for Certain Air Pollutants (new NEC Directive (2016/2284)), which sets out, among other things, the measures which are suitable in reducing ammonia emissions, mainly from agriculture, by 29 percent by 2030 compared with the reference year 2005. In addition, BMU is currently developing an action programme for integrated nitrogen reduction which will contain cross-causal proposals for measures. Agriculture harbours

[5] The new Fertiliser Application Ordinance was announced in the Federal Gazette (BGBl. Teil 1, Nr. 20) on 30 April 2020 and entered into force on 1 May 2020.

vast reactive nitrogen reduction potential. However, some of the measures will be very cost-intensive for the sector.

The Federal Government assumes that the measures already implemented and the programmes currently being developed will lead to reduced nitrogen surpluses and reduced nitrate inputs into water bodies in the medium term.

Stickstoffüberschuss der Landwirtschaft



Due to methodological changes from 2017 onwards, the data series used for the indicator was also recalculated retrospectively and thus differs from previous publications. Prior to the 2016 version of the National Sustainability Strategy, the target value of 80 kg per ha and year applied which was set in the 2002 version of the Strategy and which originally should have been reached by 2010.

Thematic areas under the National Strategy on Biological Diversity

B 2.4 Agriculture

C 6 Agriculture and silviculture

C 10 Acidification and eutrophication

Definition

Difference between nitrogen flows into and out of agriculture (overall surplus on the basis of a 'farm gate' balance)

Target

For the period 2028 – 2032, a reduction of nitrogen surpluses in the overall balance to 70 kg/ha of agricultural land and year is to be achieved as a five-year average. This target was reset in 2016. Prior to that a target of 80 kg/ha applied.

Core assessment

From 1992 to 2015, the annual nitrogen surplus fell from 116 kg/ha to 94 kg/ha (five-year rolling average). To achieve the target of 70 kg/ha in the five-year average 2028 – 2032, among other things, it is necessary to increase the efficiency of application of nitrogen fertilisers, take further measures to reduce nitrogen inputs and develop measures for more nitrogen-efficient feeding.

2.3.6 Eutrophication of ecosystems

Reactive nitrogen compounds enter the atmosphere from various sources, including industry, transport, housing and farming. They enter ecosystems via wet deposition (rain and snow), moist deposition (mist and hoarfrost), and dry deposition (gases and particulates). There, they act as nutrients whose accumulation (eutrophication) harms plants and animals, most notably in habitats that are naturally nutrient-poor. Eutrophication can result, for example, in plants adapted to low-nutrient habitats being displaced by nutrient-loving species. Numerous animal species that depend on specific plant species can be indirectly affected. Biodiversity can be harmed in this way not only in terrestrial, but also in aquatic ecosystems, as excess nitrogen compounds are leached out from the soil into water bodies.

Ecosystem-specific load limits for atmospheric inputs of harmful substances and nutrients are known internationally as critical loads (CLs). According to current knowledge, no acute or long-term harm to affected ecosystems can be expected as long as these limits are not exceeded. However, it can take decades for ecosystems to show visible signs of harm and, conversely, equally long for them to recover from long-term exceedance of critical loads. As substances are transported in the atmosphere across long distances and national borders, various international agreements are in place which aim at reducing specific types of emissions. The Gothenburg Protocol to the Geneva Convention on Long-Range Transboundary Air Pollution sets national emission ceilings for, among others, ammonia and nitrogen oxides that must be complied with since 2010, and with a requirement for states to further reduce emissions by 2020. At European level, the EU National Emission Ceilings Directive (NEC Directive) sets national emission ceilings for each member state to be complied with up to 2019 and emission reduction commitments up to 2030.

In the 2016 version of the National Strategy on Biological Diversity, a new indicator on eutrophication – ‘Eutrophication of ecosystems’ – was introduced into the set of indicators, which differs significantly from the indicator previously used in the Strategy (STATISTISCHES BUNDESAMT 2017a). The indicator was further developed as part of the so-called PINETI III project in terms of the underlying data used (SCHAAP et al. 2018). The newly defined indicator will be incorporated into the indicator set of the National Strategy on Biological Diversity and replaces the ‘Critical loads of nutrient nitrogen’ indicator reported in the 2014 indicator report. It shows the proportion of areas of sensitive ecosystems which exceed the critical loads, whereas the old indicator in the indicator set of the National Strategy on Biological Diversity represented the area in which critical loads were not exceeded. The two values cannot be compared as a result.

[Margin column: The indicator provides information on the impairment of biodiversity due to exceedance of critical loads for nutrient nitrogen.]

[Margin column: "More than half of vascular plants are only viable under low-nutrient conditions, and their stocks are therefore at risk from excessively high nitrogen discharge rates." (BMU 2007: 80)]

Indicator

The indicator reports the proportion of assessed areas of sensitive ecosystems (including nutrient-poor forests, heaths and peatlands) in which ecosystem-specific airborne critical loads of nutrient nitrogen are exceeded. Ecosystem-specific critical loads indicate the amount of a substance per area and time period that, according to current knowledge, can be deposited in a given ecosystem without causing damage in the longer term. Thus, deposition rates must be no higher in the long term than the rates at which substances can be stored by internal processes or can be absorbed or can exit the system in tolerable amounts. Temporary deviations from the input-output equilibrium are tolerable provided that the system remains capable of self-regeneration.

In accordance with the goals of the National Strategy on Biological Diversity, the proportion of areas exceeding critical loads of nutrient nitrogen is to be reduced by 35 percent by 2030 compared with levels in 2005. Based on current data, this corresponds to a 50 percent reduction in the area of the ecosystems assessed. Previously, in the National Strategy on Biological Diversity, the Federal Government had formulated the ambitious goal of achieving nationwide compliance with the critical loads of nutrient nitrogen in sensitive ecosystems by 2020.

[Margin column: "Material discharges have significant effects on biological diversity because they alter the living and site conditions." (BMU 2007: 80)]

[Margin column: The new version of the National Sustainability Strategy includes the goal of reducing the proportion of land with increased nitrogen input by 35 percent compared with 2005 *(BUNDESREGIERUNG 2017).]*

Composition

Ecosystems sensitive to nutrient nitrogen include the following types of land use (Corine Landcover Nomenclature): low-nutrient meadows and pastures, deciduous, coniferous and mixed forest, natural grassland, heaths and boggy heaths, swamps and peat bogs. Critical loads specific to these

ecosystem types are determined by taking into account factors such as vegetation, geological substrate and soil chemistry. A total of almost one-third of German land is assessed in this way. The following data is used to determine the national critical loads of nutrient nitrogen:

- Overview soil map of Germany (Bodenübersichtskarte Deutschlands 1000, BÜK)
- Map of the mean annual water percolation rate from the soil
- Land cover map (Corine Land Cover 2012)
- Climate data for Germany, long-term average (1981-2010)

Critical loads of nutrient nitrogen are calculated at a specific spatial resolution on behalf of the Federal Environment Agency (UBA) by the National Focal Centre of the International Cooperative Programme on Modelling and Mapping (ICP M & M) under the Geneva Convention on Long-Range Transboundary Air Pollution. Also on behalf of UBA, the temporal and spatial distribution of pollutant and nutrient inputs was calculated by the Netherlands Organisation for Applied Scientific Research (TNO) for the years 2000 to 2015 at a resolution of 1 x 1 km^2. Reconciliation of data on critical loads and inputs was carried out as part of the PINETI III project.

Changes compared to the indicator reported in the 2016 revision of the National Sustainability Strategy result primarily from updating the input data used in the critical load calculation. The calculation now incorporates the latest Corine dataset, resulting in a significant improvement in spatial resolution. In addition, deposition data from the PINETI III project will be used from now on, using the latest version of data from the national emissions register, reconciled with deposition measurements from various national and international monitoring networks, and with a higher spatial resolution (change from a 50 x 50 km^2 [EMEP] to a 1 x 1 km^2 [TNO] grid). With the new dataset, a higher reference value in 2005 is to be used in the calculation of the proportion of land which exceeds critical loads. With regard to the 35 percent reduction target in the proportion of land with higher nutrient inputs aimed for in 2030 compared with 2005, this results in a target value with an area measuring 50 percent of the areas covered by the ecosystems assessed.

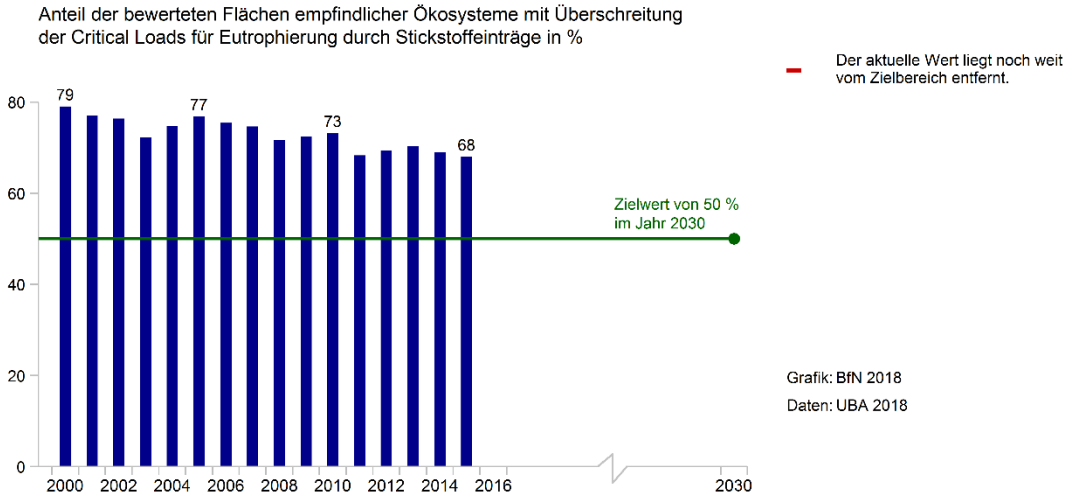
Assessment

Exceedance of critical loads as a result of long-term and current inputs of nitrogen compounds is an indicator of potential harm to the sensitive ecosystems involved. If critical loads are found to have been exceeded in certain areas, it does not mean that biological effects were visible or that damage was actually detected in the year under consideration. This is partly because adverse effects can take a considerable length of time to appear.

The proportion of areas with modelled exceedances of critical loads of nutrient nitrogen compounds has steadily declined since 2000 and stood at 68 percent in 2015. There is thus still a risk of eutrophication in nearly three-quarters of the area assessed. While emissions of nutrient nitrogen compounds from transport and industry have significantly decreased, there is no evidence of a downward trend in emissions of ammonia from farming and in fact a slight increase has occurred in recent years. These account for about two-thirds of nitrogen emissions. Overall, the background load of atmospheric nutrient nitrogen compounds thus remains too high. National and international clean air measures have delivered only minor improvements in eutrophication compared with the successes achieved in combating acidification.

To reduce the proportion of land with sensitive ecosystems with elevated nitrogen loads to 50 percent by 2030, the reduction in nitrogen inputs seen in recent years must be continued. In particular, it is necessary to reduce ammonia emissions, 96 percent of which come from agriculture and predominantly from animal husbandry. This can be achieved, for example, with low-emission processes in the storage and spreading of farm manure, including digestate, as well as in mineral fertilisation and, where necessary, through adapted, nitrogen-reduced feed processes.

Eutrophierung der Ökosysteme



Thematic areas under the National Strategy on Biological Diversity

B 3.1 Area-wide diffuse substance discharges, C 10 Acidification and eutrophication

Definition

Percentage share of the assessed area of sensitive ecosystems in which ecosystem-specific critical loads of nutrient nitrogen are exceeded in the models.

Target

Reduction in the proportion of sensitive ecosystems with exceedances of the critical loads for nitrogen inputs by 35 percent by 2030 compared with 2005. This corresponds to a reduction to 50 percent of the area of all sensitive ecosystems assessed.

Core assessment

In 2015, critical loads were exceeded in 68 percent of the area of sensitive ecosystems assessed. To reduce the proportion of land with sensitive ecosystems with elevated nitrogen loads to 50 percent by 2030, the reduction in nitrogen inputs seen in recent years must be continued, especially with a view to a significant and permanent reduction in ammonia emissions from farming.

2.3.7 Sustainable forestry

Nearly a third of German land area is covered with forest. Forests are home to a great diversity of sometimes rare and endangered plant and animal species and habitats. On most of these areas, the structure and function of the forests in the landscape ecosystem are shaped by forest management and use. These practices also significantly determine the occurrence and frequency of many animal and plant species in forests. The ways in which forests are managed are thus of great importance for biodiversity conservation.

Left to nature, Germany's forests would be dominated by deciduous tree species. The fact that today's forests, which were last afforested on a large scale after the Second World War, are dominated by conifers, particularly spruce and pine, is a legacy of the past. Since 2002, their area shares have decreased by 8 percent for spruce and 3 percent for pine and are now at 25 and 22 percent respectively. On many sites, deciduous trees promote soil-forming processes, groundwater recharge, the diversity of animal and plant species, and the stability and adaptability of forest stands, for example in the face of pests, storms and climate change. A goal of federal and Länder forestry policy is thus to turn monoculture coniferous forest into deciduous and mixed forest stands suited to local site conditions. This features in the forestry guidelines for many Länder forests, and has been supported with substantial funding in non-state woodland for a number of decades. The National Forest Inventory 2012 demonstrates the success of these efforts: German forests have again seen an increase in the proportion of deciduous trees, which now account for 43 percent of forests or woodland. This corresponds to an increase of about 7 percent compared with 2002.

The age and structural diversity of forests have also increased: almost a quarter of forest (24 percent of forest land) is more than 100 years old (an increase of 18 percent compared with 2002), and 14 percent is more than 120 years old. Germany's forests have also seen an increase in the number of old habitat trees and the volume of deadwood. These special microhabitats make an especially large contribution to biodiversity.

Mixed woodland accounts for 76 percent of German forest area. Natural rejuvenation predominates, accounting for 85 percent of the area with young forest growth. The proportion of forest area with near-natural tree species composition has changed only slightly compared with the National Forest Inventory 2002. Overall, there are slightly fewer cultivated forests and slightly more near-natural forests instead. According to the 2012 Federal Forest Inventory, 15 percent of forests have very near-natural composition and a further 21 percent near-natural composition of tree species. Depending on the forest type, development phase and location, in addition to site-appropriate, na-

tive tree species, near-natural forests have a pronounced gradation of vegetation, a sufficient proportion of old and dead wood, and numerous small structures that provide habitats for specialised species.

Conserving and promoting forest biodiversity requires greater focus on environmentally sound forms of forestry sustaining nature. The forestry sector itself recognises the benefits of near-nature forest management and is working purposefully at its implementation. Forest management certification can be an effective instrument in strengthening the conservation of forest biodiversity and ensuring ecologically, socially and economically sustainable forest management through the use of appropriate management methods. Germany currently has three established forest management certification systems.

The **Programme for the Endorsement of Forest Certification (PEFC)** goes back to an initiative of the Confederation of European Forest Owners. PEFC was established in 1999 on the basis of the Second Ministerial Conference on the Protection of Forests in Europe held in Helsinki in 1993. At 69 percent, it currently accounts for the largest proportion of certified forest area in Germany. The PEFC system is supported by numerous private, municipal and state companies in the forestry and timber industry. The **Forest Stewardship Council (FSC)** was established in 1993, a year after the United Nations Conference on Environment and Development in Rio de Janeiro. FSC is supported by environmental and nature conservation organisations, social welfare associations and many private-sector business enterprises. Marketing and the award of the **Naturland** trade mark are organised under FSC group certification.

[Margin column: The indicator provides information on the conservation of biodiversity by sustainable forestry.

[Margin column: The Federal Government formulates its vision for the future as follows: "The forests in Germany have a high level of natural diversity and momentum in terms of their structure and species composition, and people are fascinated by their beauty. The number of natural and near-natural forest communities has increased significantly. Forests are sustainably managed in line with their ecological and social functions." (BMU 2007: 31)

Indicator

The indicator reports the forest area certified under the currently established certification systems (PEFC and FSC) as a percentage of total German forest area, where the area is intended for permanent timber production (timber flooring according to the National Forest Inventory surveys in

2002 and 2012). In the National Strategy on Biological Diversity, the Federal Government has set a target of 80 percent of forest area to be certified according to high-quality ecological standards by 2010 (BMU 2007: 32).

Composition

The indicator is compiled from data provided by the PEFC and FSC certification organisations. It must be taken into account that forest areas can be certified under both systems at the same time. As it is not known what proportion of certified land is certified under both systems, the areas are shown as adjacent bars in the chart. The status is calculated on the basis of the minimum size of the certified forest area. As trends in PEFC and FSC certified area sizes are interdependent, no overall trend can be given for the indicator itself. The reference figure for computing the percentages is the total forest area in Germany intended for permanent timber production. According to the National Forest Inventory 2012, the area measured approximately 11.1 million ha.

Assessment

In 2018, 68.6 percent of forest area was PEFC certified and 12.3 percent of the total forest area in Germany was FSC certified. The sum total for 2018 was thus between 68.6 percent and 80.9 percent and thus close to the target range. Should a value of 72 percent already be exceeded, the value would actually be within the target range considering that the target value of 80 percent should have been reached by 2010.

Over the last ten reported years (2008 to 2018), the curve for PEFC certified forest shows no statistically significant trend. While new areas of land continued to be awarded PEFC certification in small-parcelled private and municipal forests, PEFC land was lost as a result of major sales of land by Bodenverwertungs- und -verwaltungs GmbHand by disposals of land by the Institute for Federal Real Estate (Bundesanstalt für Immobilienaufgaben). The share of FSC areas decreased between 2006 (5.5 percent) and 2010 (3.9 percent), but then rose again thereafter. It reached the highest level in the time series to date in 2018 (12.3 percent), but is still far below the proportion of PECF certified areas. The significant increase in 2014 is due to the certification of 317,500 ha of state forest in Baden-Württemberg. The development of FSC and PEFC certified forest areas shows an overall statistically significant trend in the direction of the target value.

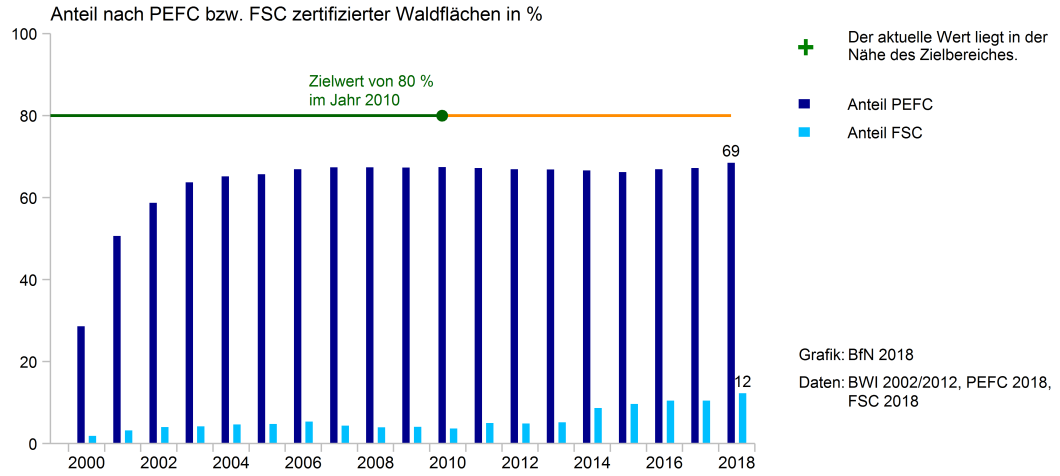
In the meantime, almost federal and Länder-owned forest is PEFC or FSC certified, and in some cases is certified by both. The ongoing aim is to further increase the overall share of forest area certified according to high-quality ecological standards. Another goal is to further enhance public responsibility with regard to the purchase of certified timber products.

[Margin column: Reasons for species endangerment in Germany cited in the National Strategy on Biological Diversity include: "Local deficits in forest management (inadequate ageing and decay periods and insufficient proportions of tree hollows and dead wood, poorly structured stocks, non-native tree species, a lack of modification in forestry techniques and wood harvesting methods)." (BMU 2007: 17)

[Margin column: The German federal government has set as a target in the National Strategy on Biological Diversity: "To certify 80% of woodland to high ecological standards by 2010" (BMU 2007: 32).

[Margin column: "In forestry, the German Government is calling for semi-natural forest management throughout all land used for silviculture purposes, as far as possible." (BMU 2007: 72)]

Nachhaltige Forstwirtschaft



Thematic areas under the National Strategy on Biological Diversity

B 1.2.1 Forests

C 6 Agriculture and silviculture

Definition

Proportion of forest area certified according to PEFC and FSC respectively as a percentage of the total forest area.

Target

80 percent of forest area is to be certified according to high-quality ecological standards by 2010.

Core assessment

In 2018, 68.6 percent of all forest area was PEFC certified and 12.3 percent was FSC certified. The ongoing aim is to further increase the overall share of forest area certified according to high-quality ecological standards.

2.4 Climate change

2.4.1 Length of the vegetation period

Climate change is expected to bring about changes in biodiversity throughout the world, including in Germany. This can affect the distribution and abundance of plants and animals, the composition of ecological communities, and the structure and functions of habitats. In many cases, as seen with species distribution, the impacts of climate change are already known and scientifically proven. The development of many organisms is influenced less by short-term temperature changes and more by the long-term temperature curve over timescales such as months or years. Monitoring the seasonal development of plants and animals – so-called phenological monitoring – is consequently a useful way of identifying the long-term effects of climate change on biodiversity.

Changes in the length of the vegetation periods[6] depend on the onset date of phenological spring (the beginning of the vegetation period) and the onset date of phenological winter (the end of the vegetation period, at the end of autumn). The onset of spring and winter is largely determined by temperatures in the preceding months. Higher temperatures at the end of phenological winter result in a measurable acceleration in plant development and hence an earlier onset of phenological spring. Conversely, the onset of winter is postponed if temperatures are higher at the end of phenological autumn. A lengthening of the period during which, for example, plants build biomass and proliferate has far-reaching consequences for biodiversity. Many animal species are also affected both positively and negatively by these phenological changes – for example, birds due to changes in food availability during the breeding season. However, the full impacts of climate warming on animals and plants and their ecological communities are highly complex and are only just beginning to be understood.

[Margin column: The indicator represents the length of the growing season as the sum of the days of phenological spring, summer and autumn.]

[Margin column: Climate change and associated global warming not only affect the seasonal patterns of animal and plant life, their distribution and growth rates, and cause changes in animal behaviour. They also induce the loss of biodiversity (BMU 2007: 81).

Indicator

[6] In areas with distinct seasons, the growing season is the phase of the year in which plants grow, flower and fruit. The phenologically defined vegetation period comprises phenological spring, summer and autumn.

The indicator reports changes in the length of the vegetation period along with shifts in the annual onset of phenological spring and winter relative to selected development stages of two indigenous wild plant species. This is supplemented with time series for the mean temperature in the three months preceding the onset of phenological spring and winter.

The Federal Government's climate change policy is in line with the goal agreed at the 2015 Climate Change Conference in Paris of limiting global warming to well below 2 °C and, if possible, to 1.5 °C below pre-industrial levels. This does not allow a quantitative target to be derived for the indicator presented here. However, the fundamental aim must be to counteract a further lengthening of the vegetation period as well as further shifts in the phenological seasons by means of consistent climate policy.

Composition

The phenological monitoring programme run by the German Meteorological Service (Deutscher Wetterdienst, DWD) covers a large number of indicator plants, in some cases with time series dating as far back as 1951. Germany thus has a precise nationwide record of phenological shifts. Certain events in the development of selected plant species are well suited as pointers to the impacts of climate change on biodiversity. The first flowering of coltsfoot (*Tussilago farfara*) was selected as a phenological phase indicating the onset of phenological spring. The commencement of leaf shedding by the pedunculate oak (*Quercus robur*) marks the transition from phenological autumn to winter. The onset of these two events is given as the number of days from the beginning of the year. The data reported to DWD is averaged to produce an annual mean figure for Germany as a whole.

The length of the vegetation period corresponds to the sum total of the number of days comprising phenological spring, summer and autumn, and is determined from the length of time between the onset dates of phenological spring and winter. It is continuously plotted against the years in the time series and presented together with the mean temperatures during the three months preceding each phenological season. A linear trend line is additionally shown for all data series for the entire reporting period from 1951 to 2018.

Assessment

The linear trend in the data points shows a marked increase in the length of the vegetation period by about 16 days to most recently about 235 days over the period 1951 to 2018. This corresponds to a mean increase of approximately one day every four years over the past 60 years. Comparing the two 30-year periods at the beginning and end of the data series reveals the same trend:

whereas the vegetation period lasted just 222 days on average in the years between 1951 and 1980, it increased by 10 days to an average of 232 days in the years between 1989 and 2018. It should be noted that the curve shows strong variability over the years: the year with the longest vegetation period so far was 1961 (247 days), followed by 2014 with 246 days. Several other peak lengths have, however, occurred in the past 30 years (1990: 244 days, 1995: 242 days, 2007 an 2016: 241 days). The shortest vegetation periods, with a maximum duration of 215 days, occurred most prominently in the 1960s and 1970s, while none occurred in the past 20 years.

Phenological spring begins earlier and earlier over the course of time. The linear trend shows the onset of spring to be nearly nine days earlier at the end of the time series in 2018 than when it started in 1951. Exceptionally early onset dates have occurred frequently since the late 1980s. While the average date for the onset of spring between 1951 and 1980 was 24 March, the average date in the years between 1983 and 2018 was seven days earlier, on 17 March. The onset of phenological winter, on the other hand, is happening later and later each year. The linear trend shows the onset of winter to be seven days later at the end of the time series in 2018 than when it started in 1951. The onset of winter also shows pronounced variation from year to year. Looking at the years between 1989 and 2018, the beginning of winter came on average on 4 November, three days later than the average date in the period 1951 to 1980.

Phenological observations since 1951 demonstrate an earlier onset of spring, which together with a later onset of winter causes a significant lengthening of the vegetation period. This trend shows a statistically significant correlation with an increase in air temperatures in the respective preceding months and can be traced back to anthropogenic warming of the Earth’s atmosphere. A longer vegetation period has various impacts on biodiversity in Germany. For example, it can result in increased ecosystem productivity. In addition, phenological shifts can lead to timing mismatches in interactions between organisms. This can affect established interdependencies such as between plants and their pollinators or in predator-prey relationships. This in turn impacts ecosystem structure and functions and can pose a threat to indigenous animal and plant species – or prompt an influx of new species.

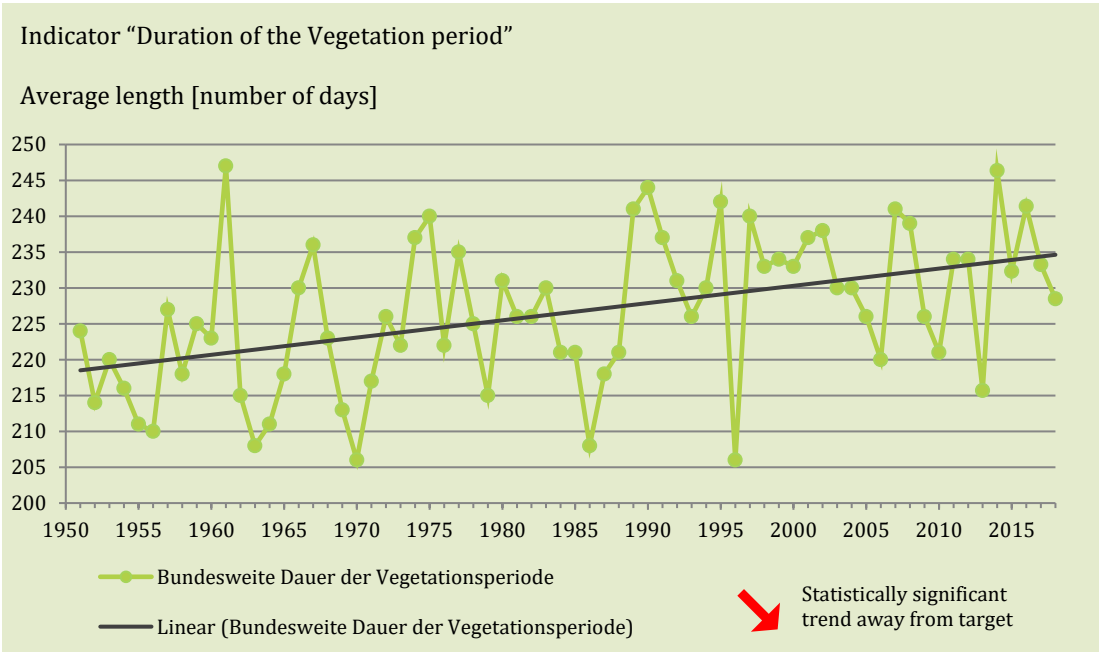


Chart: BfN (2019), data: DWD 2018

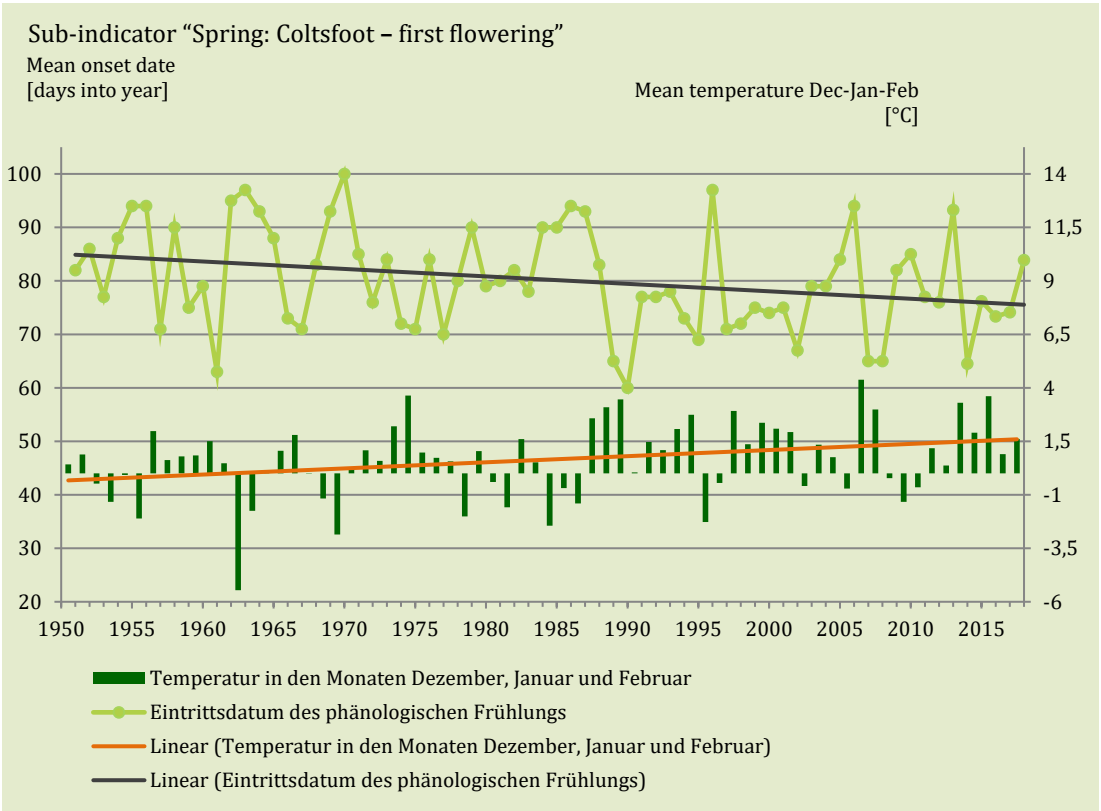


Chart: BfN (2019), data: DWD 2018

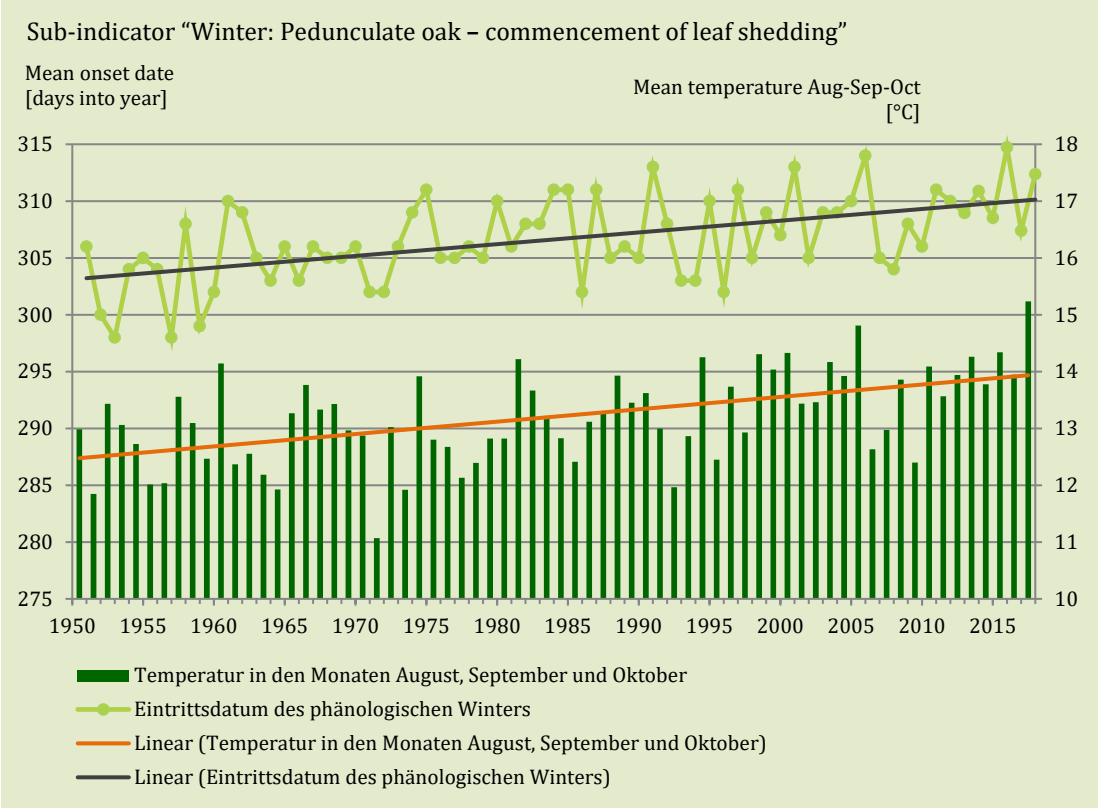


Chart: BfN (2019), data: DWD 2018

Thematic areas under the National Strategy on Biological Diversity

B 3.2 Climate change

C 11 Biodiversity and climate change

Definition

The indicator reports changes in the length of the vegetation period and the temporal shift in the onset of phenological spring and winter under the influence of climate change.

Qualitative target

The fundamental aim is to counteract any further extension of the vegetation period and other shifts in phenological seasons by means of climate protection policy.

Core assessment

The period 1951 to 2018 shows a marked increase in the length of the vegetation period by about 16 days to most recently 235 days (linear trend). This is a result of an earlier onset of spring in combination with a later onset of winter.

2.5 Public awareness

2.5.1 Awareness of biodiversity

Long-lasting conservation of biodiversity not only requires considerable effort and commitment by state institutions, but also depends on broad-based public consent and participation. People in Germany ought to be aware that biodiversity relates both to diversity of species and ecosystems and to diversity at the genetic level. They also need to be convinced of the importance of biodiversity as the foundation of life for current and future generations, and should adapt their behaviour accordingly. Everyone should feel a sense of personal responsibility for the conservation of biodiversity.

Both the Convention on Biological Diversity (CBD) and the German National Strategy on Biological Diversity highlight the great importance of public education and of promoting public awareness. Article 13 of the CBD commits the contracting parties to "promote and encourage understanding of the importance of, and the measures required for, the conservation of biological diversity, as well as its propagation through media, and the inclusion of these topics in educational programmes". In the National Strategy on Biological Diversity, the Federal Government states: "Activities to conserve biological diversity need the support of society. To this end, action-oriented learning is needed, both in the educational sector and in all other spheres of life" (BMU 2007: 61).

[Margin column: The indicator assesses public awareness of biodiversity.]

Indicator

The indicator assesses awareness of biodiversity in the German-speaking resident population aged 18 or over. For the assessment, recognition of the term 'biodiversity' ('knowledge' sub-indicator), appreciation of the value attached to biodiversity ('attitude' sub-indicator), and willingness to help promote biodiversity conservation ('motivation' sub-indicator) are combined into an aggregate indicator.

The following target for the indicator is derived from specifications in the National Strategy on Biological Diversity: by 2015, at least 75 percent of the population have an awareness of biodiversity that is at least sufficient for all three sub-indicators. The aggregate indicator assesses the degree to which this target has been attained.

[Margin column: "In the year 2015, at least 75% of the population will rate the conservation of biological diversity as one of the top priorities for society." The significance of biological diversity is

firmly anchored in social consciousness. Human activity is increasingly tailored to this realisation, leading to a significant decline in the pressures on biological diversity." (BMU 2007: 60)]

Composition

The underlying data for the indicator is provided by representative surveys of approximately 2,000 people aged over 18 selected from the German-speaking residential population. The number of respondents is large enough to permit comparison of awareness of biodiversity between sub-groups, for example comprising individuals with higher or lower formal education. The surveys are incorporated into the nature awareness studies published jointly by the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) and the Federal Agency for Nature Conservation (BfN). The first comprehensive nature awareness study was conducted in 2009 and others have followed in a two-year cycle thereafter. The results of the 2017 study were published by BMU and BfN in 2018. The results of the third nature awareness study from 2019 could not be included in this report.[7]

The survey consists of two questions on knowledge, seven on attitudes and six on motivation. The three sub-indicators are first calculated separately. The value of each sub-indicator is the percentage of people whose responses rank sufficient or better in relation to the targets on awareness building in the National Strategy on Biological Diversity. An aggregate indicator is then compiled, stating the percentage of survey respondents who meet the requirements in all three sub-areas, meaning they have at least sufficient awareness with regard to biodiversity. As an outcome of this construction, the lowest value among the three sub-indicators determines the value of the aggregate indicator.

In 2009 and 2011, the indicator and the three sub-indicators were calculated without weighting the data. From 2013, the data was weighted to correct minor differences between the sample and the parent population, and hence to make the results more representative. This change in methodology does not affect the basic comparability of data in the time series.

[Margin column: The following recommendations to improve awareness of biodiversity are based on the targets and measures in the National Strategy on Biological Diversity and should be implemented in the near future:
The importance of biodiversity conservation and of ways to use biodiversity that sustain nature needs to be more firmly rooted as a key topic in education than was previously the case. To reach

[7] Those results will be available online from 14 August 2020.

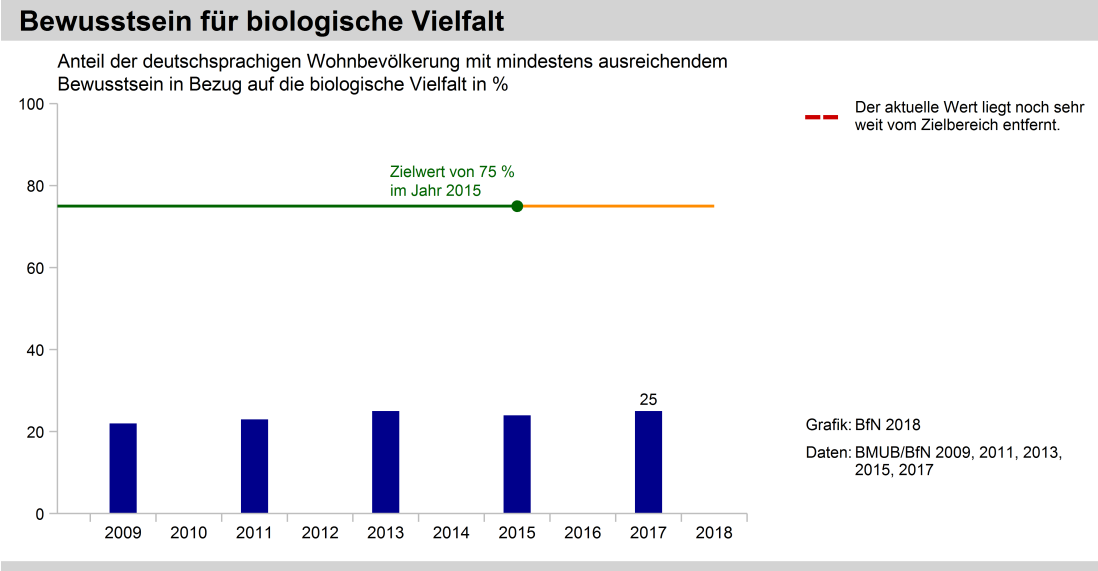
the broadest possible cross-section of the population, offers in educational programmes need to be expanded by many providers in line with the needs and realities of various target audiences. Knowledge about the value of biodiversity needs to be better disseminated using the full range of modern communication channels that are specifically directed towards different target audiences.]

Assessment

According to the latest survey findings from October and November 2017, 25 percent of the German-speaking resident population aged 18 or over have at least sufficient knowledge and a positive attitude regarding biodiversity and display corresponding levels of motivation. The value of the aggregate indicator is thus not only very far from the target, it also indicates no positive trend in relation to the target. Between 2009 and 2017, the values of the aggregate indicator fluctuate by a maximum of three percentage points. The differences between the values are not statistically significant.

Looking at the sub-indicators separately reveals a varied picture. Of the respondents surveyed in 2017, 42 percent know and understand the term ‘biodiversity’ (knowledge indicator). 54 percent of respondents have positive attitudes to biodiversity (attitude indicator) and 56 percent are motivated to adapt their conduct so as to promote the conservation of biodiversity (motivation indicator). Like the aggregate indicator, the time series for the ‘knowledge’ and ‘attitude’ sub-indicators each fluctuate only slightly over the survey years. The ‘motivation’ sub-indicator is subject to somewhat greater fluctuation. The values cover a range of 13 percentage points with the lowest value of 46 percent in 2011 and the highest value of 59 percent in 2015. All three sub-indicators are thus still far from the 75 percent target

Suitable measures are thus required to promote awareness at all three levels. Education and information programmes need to be directed at various target audiences and be specifically adapted to account for their particular interests and needs. Whether someone recognises the term ‘biodiversity’ and knows what it means is largely a matter of their social situation: people from less well-off social milieus are significantly less likely to know what the term means. Personal attitudes and motivation to help conserve biodiversity are likewise weaker in such milieus. The National Strategy on Biological Diversity contains a large range of measures on public awareness, education and information whose systematic implementation is intended to help improve awareness of biodiversity.



Thematic areas under the National Strategy on Biological Diversity

B 5 Public awareness

C 14 Education and information

Definition

The indicator assesses awareness of biodiversity in the German-speaking resident population aged 18 or over in the three sub-areas of knowledge, attitude and motivation.

Target

By 2015, at least 75 percent of the population have an awareness of biodiversity that is at least sufficient for all three sub-areas (knowledge, attitude and motivation).

Core assessment

In 2017, 25 percent of the population have at least sufficient awareness of biodiversity. As the current indicator value still remains very far from the target, greater effort is needed to communicate the importance of biodiversity appropriately to various target audiences.

3 Overall assessment

In the pages that follow, key information on the 18 indicators of the National Strategy on Biological Diversity is presented again in the form of an overview with data as of June 2019. For a total of 13 indicators with quantitative target values, a degree of target achievement (status) can be given, which is calculated from the distance between the last reported data point and the target value.

Status	Target attainment	Indicators
++	≥90 percent Current value within target range	• Landscape dissection
+	80 percent to <90 percent Current value close to target range	• Sustainable forestry
–	50 percent to <80 percent Current value still far from target range	• Species diversity and landscape quality • Conservation status of Habitats Directive habitats and species • Status of floodplains • High nature value farmland • Agricultural nitrogen surplus • Eutrophication of ecosystems
––	<50 percent Current value still very far from target range	• Endangered species • Ecological status of surface waters • Increase in land use for settlement and transport • Organic farming • Awareness of biodiversity
	No status determined	• Invasive alien species • Protected areas • Agri-environment-climate measures (AECMs) • Genetic diversity in agriculture • Length of the vegetation period

The values of 11 indicators with a quantified target value are still far or very far from the target range. Based on the data available, in many cases the most recently reported figures for the indicators are several years old. For the ‘Conservation status of Habitats Directive habitats and species’, ‘Ecological status of surface waters’ and ‘Status of floodplains’ indicators, no more recent

data is available than the 2009 data already published in the Indicator Report 2014 and the Progress Report 2017 (Rechenschaftsbericht, BMUB 2018). All other indicators were reported using more recent data.

Only for the 'Landscape dissection' indicator is the last-reported value from 2015 within the target range. This value has, however, fallen below the value in 2005. The current value of the 'Sustainable forestry' indicator is close to the target range. The target values for the 'Ecological status of surface waters', 'High nature value farmland' and 'Awareness of biodiversity' should have been reached in 2015, but have still not been met. The remaining targets which are linked to specific years relate to 2020 or 2030.

Trend	Key	Indicators
	Statistically significant trend towards target	• Protected areas • Increase in land use for settlement and transport • Organic farming • Agricultural nitrogen surplus
	No statistically significant trend (neither rising nor falling)	• Species diversity and landscape quality
	Statistically significant trend away from target	• Length of the vegetation period
	No identifiable trend	• Endangered species • Conservation status of Habitats Directive habitats and species • Invasive alien species • Ecological status of surface waters • Status of floodplains • Landscape dissection • Agri-environment-climate measures • High nature value farmland • Genetic diversity in agriculture • Eutrophication of ecosystems • Sustainable forestry • Awareness of biodiversity

Trend analysis was possible for a total of six indicators. For a further 11 indicators, there are not yet sufficient data points to allow a trend analysis. For the 'Sustainable forestry' indicator, an overall trend cannot be identified due to the structure of the data involved. Particularly for many of the

newly developed indicators, there are so far only a small number of reported figures, and it will be many years before reliable trend analysis can be performed.

The trend analysis reveals a predominantly positive assessment for the six indicators assessed. Four indicators show a statistically significant trend towards their respective quality target or specific target value. The ‘Length of the vegetation period’ indicator, by contrast, displays a statistically significant trend away from the target value, while for the ‘Species diversity and landscape quality’ indicator no statistically significant trend is observed. It is evident that if the current trend is sustained, the targets for 2020 or 2030 will likely not be met unless additional efforts are made.

Very low levels of target attainment are recorded for endangered species, the ecological status of surface waters, the increase in land use for settlement and transport, organic farming and awareness of biodiversity. The indicators ‘increase in land use for settlement and transport’ and ‘organic farming’, however, do show statistically significant trends towards the respective targets in the past 10 years. With regard to the ecological status of surface waters, it should be noted that, relative to the very ambitious goals under the National Strategy on Biological Diversity, the Water Framework Directive allows for extensions of the deadline up to 2027.

The action taken so far is not enough to attain all aspects of the targets set in the National Strategy on Biological Diversity. As the trends in the various indicators clearly show, turnaround has yet to be achieved in some cases and target attainment is progressing very slowly in others. While work has already started on many of the measures specified in the action areas under the National Strategy on Biological Diversity, in many cases such measures have yet to deliver positive results. This is partly because environmental pressures have not yet been alleviated to a sufficient extent. On the other hand, populations of animal and plant species as well as habitats often require long periods of time for regeneration, which is why successes can only be reflected in the values of the indicators on the status of species and habitats after some considerable delay. And because some indicators are only updated at relatively long intervals and collating the data for others is extremely time-intensive, the most recent reported figures can often be several years old. For Germany, the conservation of biodiversity remains a key challenge for the future.

Summary table

The assessment outcomes as of June 2019 are presented in the summary table on the pages that follow. The indicators are arranged under the five main headings of components of biological diversity, settlement and transport, economic activities, climate change, and public awareness. The information provided for each indicator consists of the variable measured or observed, the last value

reported, target/target value, status (degree of target attainment), and trend. Further information on the determination of status and trend of the indicators and an explanation of the symbols used are contained in the introduction to Chapter 2 and in the legend to the summary table.

The table also provides additional information on the use of the indicators in other indicator systems (where applicable in modified form): Streamlining European Biodiversity Indicators (SEBI), National Sustainability Strategy (DNS), Kernindikatorensystem Umwelt (KIS) (Environmental Key Indicator System), Länderinitiative Kernindikatoren (LIKI) (Länder Initiative on Core Environmental Sustainability Indicators), and the indicator system for the German Strategy for Adaptation to Climate Change (DAS). The right-hand column contains the core assessment for each indicator. This briefly summarises the indicator trend and action needed in the corresponding thematic area.

Legend: Status

++	Zielerreichungsgrad ≥ 90 %	Der aktuelle Wert liegt innerhalb des Zielbereiches.
+	Zielerreichungsgrad 80 % bis < 90 %	Der aktuelle Wert liegt in der Nähe des Zielbereiches.
-	Zielerreichungsgrad 50 % bis < 80 %	Der aktuelle Wert liegt noch weit vom Zielbereich entfernt.
--	Zielerreichungsgrad < 50 %	Der aktuelle Wert liegt noch sehr weit vom Zielbereich entfernt.

Legend: Trend

↗	Statistisch signifikanter Trend hin zum Ziel bzw. Zielwert
~	Kein statistisch signifikanter Trend feststellbar (keine Signifikanz für ansteigenden oder abfallenden Trend)
↘	Statistisch signifikanter Trend weg vom Ziel bzw. Zielwert

Legend: Indicator systems

SEBI Streamlining European Biodiversity Indicators

DNS *Deutsche Nachhaltigkeitsstrategie* (National Sustainability Strategy)

KIS *Kernindikatorensystem Umwelt* (Environmental Key Indicator System)

LIKI *Länderinitiative Kernindikatoren* (Länder Initiative on Core Indicators on Environmental Sustainability)

DAS Deutsche Anpassungsstrategie an den Klimawandel (Indicators for the German Strategy for Adaptation to Climate Change)

Data as of: June 2019

Indicator		Variable measured or observed	Last reported value	Target/ Target value	Status	Trend	Indicator system	Core assessment
Components of biological diversity								
1	Species diversity and landscape quality	Index (percentage index) of population sizes throughout Germany of selected representative bird species in primary habitat and landscape types	70% (2015)	100% in 2030	–	~	DNS, KIS, LIKI, SEBI	In the past ten reporting years (2005 to 2015), the indicator has not deteriorated further. No statistically significant trend in the aggregate indicator was detected in the period in question. However, the aggregate indicator value and the values for the sub-indicators – with the exception of the forests sub-indicator – are still far from the target range. If the trend continues unchanged, the target of 100 percent in 2030 cannot be attained without considerable additional effort, ideally in all relevant policy areas, at national, Länder (state) and municipal level.
2	Endangered species	Index (percentage index) based on the rankings of selected species groups in categories used in German national Red Lists	19% (2016)	11% in 2020	– –	–	KIS, SEBI	Calculated for the time being solely for 48 groups, the indicator stands at 19 percent for 2016. Major species conservation efforts are needed to attain the 11 percent target by 2020.
3	Conservation status of Habitats Directive habitats and species	Index (percentage index) of the weighted conservation status of the Habitats Directive habitats and species in Germany's three biogeographical regions	46% (2013)	80% in 2020	–	–	SEBI	On the basis of the 2013 Habitats Directive report (2007–2012 reporting period), the indicator value stands at 46 percent. This is still far from the target range. Efforts to improve the conservation status of Habitats Directive habitats and species must thus be significantly increased.

4	Invasive alien species	Number of Union list invasive alien species seperated into the number of species in the early stage of invasion (first sub-indicator) and the number of species that since 2010 have overcome the early phase of invasion and are now considered widespread (second sub-indicator)	9/0 species (2018)	No further increase in invasive alien species	–	–	KIS, SEBI	Immediate action must be taken against nine Union list invasive alien species which were in the early stage of invasion in 2018. Since 2010, none of the species in the first sub-indicator has been classified as widespread in Germany.
5	Protected areas	Total size of strictly protected areas (nature conservation areas and national parks) as a percentage of the German land surface	4.4% (2017)	–	–	↗	KIS, LIKI, SEBI	The total size of strictly protected areas increased between 2000 and 2017 from 3.2 percent to 4.4 percent of German land surface.
6	Ecological status of surface waters	Proportion of surface water bodies – sections of rivers, streams, lakes, transitional waters and coastal waters – with good or high ecological status as a percentage of all assessed water bodies.	8% (2015)	100% in 2015	−−	–	LIKI, SEBI	Only eight percent of water bodies attained good or high ecological status in 2015. The most frequent causes of impairment are changes in the structure of water bodies and large nutrient inputs from agriculture.
7	Status of floodplains	Index (percentage index) based on the status assessment of 79 river floodplains included in the Floodplains Status Report (*Auenzustandsbericht*)	19% (2009)	29% in 2020	−	–	–	Overall, the major German river floodplains are severely modified (indicator value 19 percent in 2009). Great efforts continue to be required to conserve and develop biodiversity in river floodplains.
Settlement and transport								
8	Increase in land use for settlement and transport	Average increase in land use for settlement and transport in ha per day (four-year rolling average)	58 ha (2017)	<30 ha in 2030	−−	↗	DNS, KIS, LIKI	The four-year running average fell from 129 ha per day in 2000 to 58 ha per day in 2017. Despite the positive trend, the current value is still very far from the target. Consequently, instruments and measures to reduce the increase in land use must be rigorously applied, enhanced and supplemented with new instruments.

9	Landscape dissection	Proportion of undissected low-traffic areas with a minimum size of 100 km^2 as a percentage of the German land area, and effective mesh size (M_{eff})	23.5% (2015)	25.4% (no year specified)	++	–	KIS, LIKI, SEBI	The proportion of undissected low-traffic areas with a minimum size of 100 km^2 decreased from 26.5 percent to 23.5 percent between 2000 and 2015. In the same period, the effective mesh size (M_{eff}) decreased from 84 km^2 to 80 km^2. Germany has a well-developed transport infrastructure and, consequently, the focus of future investment spending will be on maintaining the infrastructure in place.
Economic activities								
10	Agri-environment-climate measures	Total supported area under agri-environmental measures (from 2014 agri-environment-climate measures) and funding granted for this area with positive effects for nature conservation and environment protection	4.3 million ha €813 million (2017)	–	–	–	KIS	In the new funding period from 2014 onwards, the considerably increased funding was concentrated on considerably fewer funded areas from 2016 onwards. This is the result of cost-intensive measures that can be assumed to have a greater positive effect on the agri-environment.
11	Organic farming	Area of organically farmed land as a percentage of the total agricultural land area	7.3% (2018)	20% in 2030	−−	↗	DNS, KIS, LIKI, SEBI	Since 1999, the proportion of organically farmed land area has increased continuously (7.3 percent in 2018). However, the 20 percent target is far from being reached. Based on the Strategy for the Future of Organic Farming, the Federal Government will further expand organic farming to increase the proportion of land to 20 percent by 2030.
12	High nature value farmland	Area of high nature value (HNV) farmland as a percentage of the total farmland area	11.4% (2017)	19% in 2015	−	–	SEBI	In 2017, exceptionally high, very high and moderately high nature value farmland area accounted for 2.4, 4.4 and 4.7 percent of the total farmland area respectively (adding up to an 11.4 percent share for HNV farmland area as a whole). To attain the target by 2015, specific action must be taken to promote biodiversity in agricultural landscapes and particular attention should be paid to the areas of moderately high nature value.

13	Genetic diversity in agriculture	Percentage share of endangered indigenous farm animal breeds (horse, cattle, pig, sheep and goat)	70% (2017)	Reducing endangerment to farm animal breeds	–	–	SEBI	In 2017, the proportion of endangered indigenous breeds is very high at slightly over 70 percent. Specific action must be taken to reduce the threat situation.
14	Agricultural nitrogen surplus	Difference between nitrogen flows into and out of agriculture (overall surplus based on a 'farm gate' balance) – five-year running average	94 kg/ha*a (2015)	70 kg/ha per year in 2030	–	↗	DNS, KIS, LIKI, SEBI	From 1992 to 2015, the nitrogen surplus fell from 116 kg/ha and year to 94 kg/ha and year (five-year rolling average). To achieve the target of 70 kg/ha in the five-year average 2028 - 2032, among other things, it is necessary to increase the efficiency of application of nitrogen fertilisers, take further measures to reduce nitrogen inputs and develop measures for more nitrogen-efficient feeding.
15	Eutrophication of ecosystems	Proportion of area in which ecosystem- specific critical loads of nutrient nitrogen are exceeded	68% (2015)	50% in 2030	–	–	KIS, SEBI	Critical loads were exceeded in 68 percent of the assessed area of sensitive ecosystems in 2015. To reduce the proportion of land with sensitive ecosystems with elevated nitrogen loads to 50 percent by 2030, the reduction in nitrogen inputs seen in recent years must be continued, especially with a view to a significant and permanent reduction in ammonia emissions from farming.
16	Sustainable forestry	Proportion of PEFC and FSC certified forest area respectively as a percentage of the total forest area	68.6%/ 12.3% (2018)	80% in 2010	+	–	KIS	In 2018, 68.6 percent of all forest area was PEFC certified and 12.3 percent was FSC certified. The ongoing aim is to further increase the overall share of forest area certified according to high-quality ecological standards.

Climate change								
17	Length of the vegetation period	The indicator reports changes in the length of the vegetation period and the temporal shift in the onset of phenological spring and winter under the influence of climate warming.	235 days (2018)	No further lengthening of the vegetation period	–	↘	LIKI, DAS	The period 1951 to 2018 shows a marked increase in the length of the vegetation period by about 16 days to most recently 235 days (linear trend). This is a result of an earlier onset of spring in combination with a later onset of winter.
Public awareness								
18	Awareness of biodiversity	Proportion of the German-speaking resident population aged 18 or over meeting certain minimum requirements in relation to biodiversity in the three sub-areas of knowledge, attitude and motivation	25% (2017)	75% in 2015	−−	–	SEBI	In 2017, 25 percent of the population have at least sufficient awareness of biodiversity. As the current indicator value still remains very far from the target, greater effort is needed to communicate the importance of biodiversity appropriately to different target audiences.

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