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Indicator Report 2010

to the National Strategy on Biological Diversity

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1 Introduction

Biodiversity is essential to human survival and wellbeing. The term not only applies to species diversity of plants, animals, fungi and microorganisms. It 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 CBD internationally and in 2007 presented its own National Strategy on Biological Diversity (BMU 2007).

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. A broad-based political and social process incorporating state and non-state actors has been launched for its implementation. A large variety of measures, from agri-environmental 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 needs a reliable and transparent way of monitoring success while making allowance for the fact that many measures will not show progress until the medium to long term.

The National Strategy on Biological Diversity provides for a summary analysis of success using indicators. For this purpose, it contains a set of 19 indicators that are linked to its visions and action areas and meet international requirements. The indicators summarise complex phenomena in clear and comprehensible form and provide a way of visualising trends. They are intended to be updated and published at appropriate intervals. Calculation and assessment of the indicators are integral parts of reports on implementation of the Strategy to be presented by the German federal government during each legislative term.

The first German federal government report on target attainment and implementation of measures under the Strategy is planned for 2012. In advance of that publication, the indicator set for the National Strategy on Biological Diversity has been revised since the end of 2007 and is now presented in a standardised format for the first time in this Indicator Report.

The 19 indicators in the revised indicator set are arranged under five main headings:

- Components of biological diversity (7 indicators)
- Settlement and transport (2 indicators)
- Economic activities (8 indicators)
- Climate change (1 indicator)
- Public awareness (1 indicator)

European Otter (*Lutra lutra*)

Changes in the indicator set as adopted in 2007 under the National Strategy on Biological Diversity are as follows:

- The former 'Natura 2000 area designations' indicator traced progress in building the Natura 2000 protected area network. With Natura 2000 site nominations now complete, the indicator is no longer needed and reporting has ceased.
- The 'Number of non-native fauna and flora species in Germany' indicator has been replaced with an 'Invasive alien species' indicator, which relates solely to invasive alien species – non-indigenous animal and plant species that pose a significant potential threat to biodiversity. The new indicator is designed to help measure future success in combating invasive alien species.
- The former 'Water quality' indicator is superseded by a newly developed 'Ecological status of surface waters' indicator, which is based on a comprehensive assessment of surface water bodies and their ecological status.
- The 'Status of floodplains' indicator is new to the indicator set. It tracks anthropogenic changes to floodplains at national level in Germany for the first time.
- Also new is the 'High nature value farmland' indicator, which reports the area of high nature value farmland as a percentage of the total farmland area.
- The new 'Genetic diversity in agriculture' indicator provides information on genetic diversity for the first time. The indicator assesses the degree of threat to genetic resources using selected indigenous farm animal breeds.
- A further addition is the 'Exceedance of critical loads for nitrogen' indicator. This tracks adverse impacts on biodiversity as a result of nutrient nitrogen loads exceeding critical levels.
- On current consensus, the 'Marine trophic index' indicator is not sensitive enough to adverse impacts of fisheries because it relates solely to commercial fisheries landings. It is consequently no longer reported. Work is not yet complete on the 'Populations of selected commercial marine species' indicator to be developed for the thematic area of sustainable marine fisheries under the National Strategy on Biological Diversity. This indicator is briefly covered in Chapter 4 (Outlook).
- Development of the 'Urban sprawl' indicator is similarly yet to be completed. Information on this topic is likewise provided in Chapter 4.

The United Nations proclaimed 2010 as the International Year of Biodiversity. This challenges us all to take stock, nationally and internationally, of progress in biodiversity conservation. This first Indicator Report under the National Strategy on Biological Diversity presents trends for Germany and shows in particular where the country stands both with regard to the CBD 2010 target of significantly reducing biodiversity loss and in terms of the more ambitious EU 2010 target of halting biodiversity loss. The report highlights progress and areas for further action, indicating the future course to be taken by nature conservation policy and other policy areas relevant to the conservation and sustainable use of biodiversity in Germany.

Meandering stream in Upper Bavaria

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

In the sections that follow – arranged under the five main headings of Components of biological diversity, Settlement and transport, Economic activities, Climate change, and Public awareness – the 19 indicators in the current indicator set are assessed and interpreted according to a uniform scheme. 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 biodiversity. Next, a section with the subheading 'Indicator' defines the indicator concerned and states the relevant target in the National Strategy. The 'Composition' section gives information on data sources and briefly shows how the indicator is compiled and calculated. A final section with the subheading 'Assessment' interprets changes in indicator values. Recommendations for action are also given here.

The targets for some indicators are qualitative rather than quantitative. 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 visualised using four symbols. The class boundaries for the target attainment status are as follows:

++	Target attainment ≥ 90%	Current value within target range
+	Target attainment 80% to < 90%	Current value close to target range
-	Target attainment 50% to < 80%	Current value still far from target range
--	Target attainment < 50%	Current value still very far from target range

Trend information is also provided to the extent that suitable data are available. The trend is determined for a 10-year period from the last 11 data points using a common statistical measure (Spearman's rank correlation coefficient). Exceptions are the 'Climate change and onset of spring' indicator (trend calculated for the period 1951 to 2009 with 59 data points), the 'Protected areas' indicator (2000 to 2008 with 9 data points) and the 'Sustainable forestry' indicator (2000 to 2009 with 10 data points). The results are classified as follows:

↗	Statistically significant trend towards target
~	No statistically significant trend (neither rising nor falling trend statistically significant)
↘	Statistically significant trend away from target

No trend information can be provided if there are too few data points or if data points over the period are not fully comparable.

Changes in an indicator and any sub-indicators are shown in a standard chart. Alongside the chart, the main information about the indicator is given in summary form, comprising references to thematic areas in the National Strategy on Biological Diversity, the definition of the indicator, quantitative or qualitative targets, 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 19 indicators under the National Strategy on Biological Diversity are combined into an overall assessment and presented in a summary table. This is followed by an outlook section on additional indicators currently under development. The Report ends with a list of references for further reading.

2.1 Components of biological diversity

European Tree Frog (*Hyla arborea*)

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. In Germany, the natural environment has been shaped by centuries of land use, creating species-rich cultural landscapes. Conserving the biodiversity that has arisen in this way along with naturally arising biodiversity requires sustainable forms of land use, a reduction in environmental pressures and responsible treatment of the natural environment.

Northern Lapwings (*Vanellus vanellus*)

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 indicator provides information about species diversity, landscape quality and the sustainability of land use.

If reduced environmental pressures, more sustainable land use or successful nature conservation measures cause habitat quality to improve, populations of the selected bird species will generally grow and the indicator will rise.

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 has also been reported recently in the Indicator Report 2010 under the National Sustainability Strategy (Statistisches Bundesamt 2010).

◄ Indicator

The indicator provides information on species diversity, landscape quality and the sustainability of land use. It is compiled on the basis of population trends in 59 bird species representative of Germany's primary landscape and habitat types (farmland, forests, settlements, inland waters, coasts/sea and the Alps). Two species are included in both the forest and the Alpine sub-indicator.

For target setting purposes, an expert panel determined for each bird species the population size attainable by 2015 if European and national law on nature conservation and sustainable development principles are promptly implemented. The targets for each species in 2015 were initially determined as a multiple of the population figures known at the time for 2002. The resulting index figures were then normalised to 100%. The target for each sub-indicator and for the aggregate indicator is thus 100%.

The German federal government has decided for reporting purposes of the National Strategy on Biological Diversity to use the 'Species diversity and landscape quality' indicator with a target of 100% in 2015 for the aggregate indicator and each of the six sub-indicators.

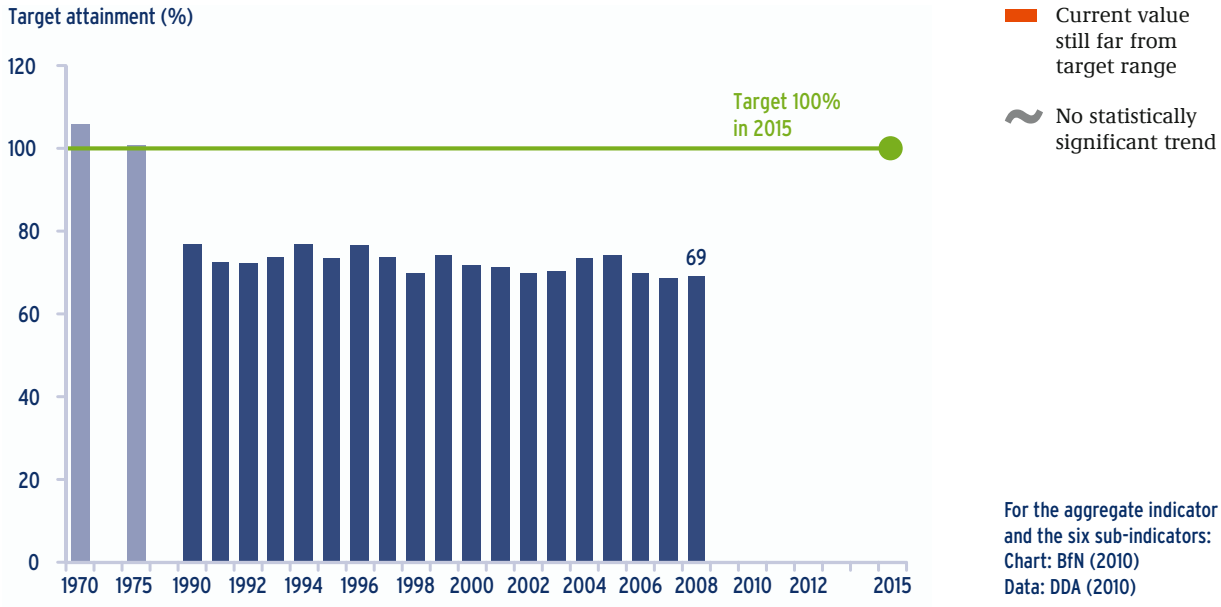
Composition ►

In consultation with state-run ornithological stations in the German federal states and the Federation of German Avifaunists (DDA), ten representative bird species (eleven for forests) were selected as indicator species for each of the six primary habitat and landscape types (farmland, forests, settlements, inland waters, coasts and sea, and the Alps). An index value for the German population is computed annually for each species from the number of territories or breeding pairs counted in statistically representative sample plots. The current population size for each species is expressed as a percentage of the target population determined for 2015. This percentage represents the level of target attainment in the current year.

For each primary habitat or landscape type, the arithmetic mean is then calculated from the target attainment percentages for all ten or eleven bird species. These average figures serve as sub-indicators, allowing the status of the six primary habitat or landscape types to be viewed 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.

The historical figures for 1970 and 1975 are reconstructed. Figures for some bird species in habitats of inland waters, coasts/sea and the Alps are extrapolated for certain years. The figures for two Alpine bird species include minor corrections.

Species diversity and landscape quality



For the aggregate indicator and the six sub-indicators:
Chart: BfN (2010)
Data: DDA (2010)

Thematic areas
Almost all thematic areas, notably C 1 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 six primary habitat and landscape types

Target
Each of the six sub-indicators and the aggregate indicator shall attain the target of 100% by 2015.

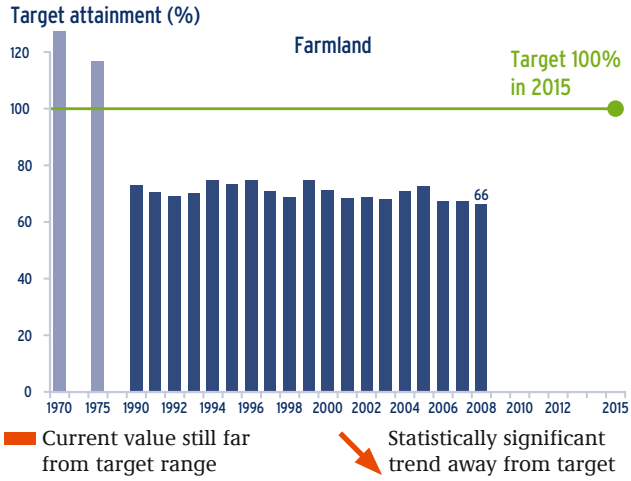
Core assessment
The current values are still far from the target range. The forest sub-indicator alone is close to the target range, at slightly above 80%. If the trend does not change, the target of 100% in 2015 cannot be attained without considerable additional effort, ideally in all relevant policy areas, at national, federal state and municipal level.

Primary habitat/ landscape type	Weighting	Selected representative bird species
Farmland	0.50	Whinchat, Skylark, Yellowhammer, Corn Bunting, Woodlark, Northern Lapwing, Red-backed Shrike, Red Kite, Little Owl, Black-tailed Godwit
Forests	0.27	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	0.03	Alpine Accentor, Western Capercaillie, Bonelli's Warbler, Three-toed Woodpecker, Nuthatch, Ring Ouzel, Robin, Golden Eagle, Common Treecreeper, Willow Tit

◄ Assessment

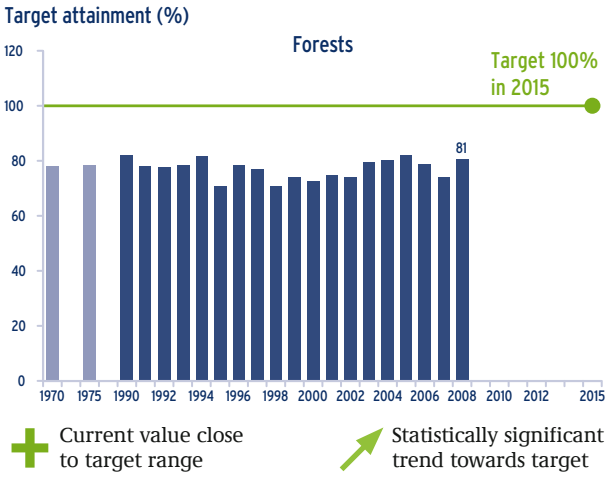
The species diversity indicator for 1990 was significantly down compared to the reconstructed figures for 1970 and 1975. This reflects population crashes during the years preceding 1990 in many indicator species associated with farmland, human settlements and inland waters. In contrast, the sub-indicators for forests, coasts and sea and the Alps remained level over the same period. In the last ten years monitored (1998 to 2008), the indicator has scarcely changed and shows no statistically significant trend. The figure for 2008 was 69% of the target. If the trend does not change, the target of 100% in 2015 cannot be attained without considerable additional effort, ideally in all relevant policy areas, at national, federal states and municipal level.

The sub-indicators for farmland (66% of the target in 2008), settlements (59%) and coasts and sea (56%) showed a statistically significant trend away from the target in the ten years to 2008. No statistically significant trend was measurable for inland waters (73%) and the Alps (57%). The sub-indicator for forests alone displayed a statistically significant upward trend. At 81% of the target in 2008, forests also showed the most favourable situation relative to the other sub-indicators.

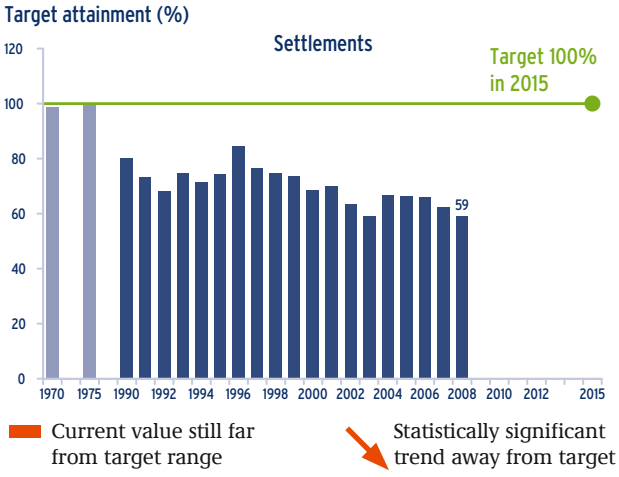


The population situation of many **farmland** bird species is critical. Populations of birds that breed on arable land, meadows and pasture are declining at regionally varying rates due to intensive farming. Landscape quality and species diversity may be affected as growing areas of grassland are ploughed up for arable use in some regions and as the cultivation of energy crops becomes increasingly widespread. It also remains to be seen how the adopted agri-environmental and nature conservation measures will affect the population situation in the medium to long term.

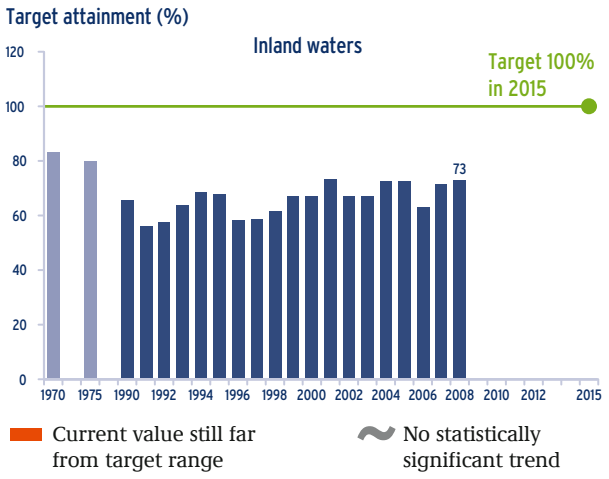
Despite the forest clearance practices and spruce plantations of the past, **forests** currently have the most favourable sub-indicator value. This is likely to reflect the promotion of nature-orientated forestry. Maintaining or accelerating the statistically significant positive trend necessitates the extension and even wider adoption of state funding schemes such as forest environmental measures. Although the situation for forests is more favourable than for the other sub-indicators, the target for forests still has to be attained. Achieving it requires consistent adherence to nature-orientated forestry practices and to nature conservation objectives in forestry management.

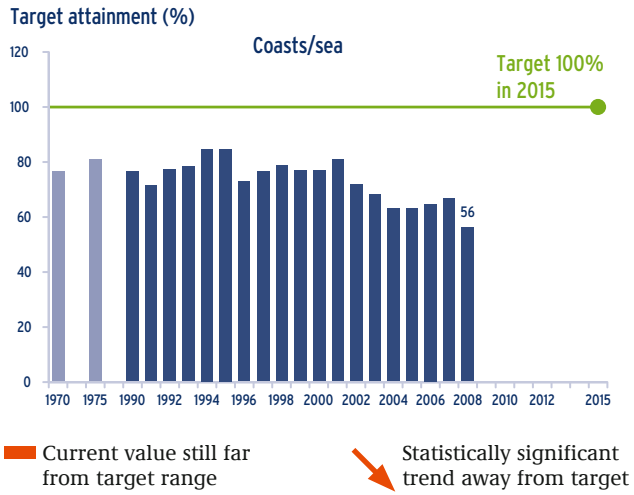


In human **settlements**, species that nest in and around buildings and species that depend on fallow land, orchards and farming elements in villages and on settlement margins show a negative trend. The main reasons are likely to be the increasing amount of land sealed under impervious surfaces and the loss of near-natural habitats and village structures.

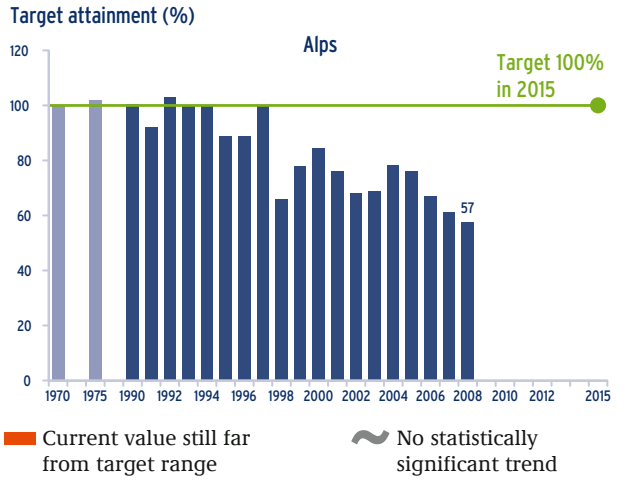


The **inland waters** sub-indicator shows large variation over recent years without any significant trend. A key part in the future development of such habitats will be played by measures to renaturalise rivers and floodplains; measures of this kind are to be stepped up in implementation of the Water Framework Directive.





The negative trend for **coasts and the sea** mainly relates to breeding populations of beach and sand dune species. Implemented coastal conservation measures have not yet reversed this trend.



Although some bird species of the **Alps** show negative population changes, there is no significant trend. Alongside increasing development of remote areas, the primary causes are thought to be more intensive farming and the abandonment of traditional forms of cultivation.

Summary

The main causes of species diversity loss are, to regionally varying degrees, intensive farming, landscape dissection and urban sprawl, soil sealing and pollutants such as 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. 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), additional effort is needed, ideally in all relevant policy areas, at national, federal state and municipal level.

Endangered species

Eurasian Lynx (*Lynx lynx*)

Measures to protect species are a central topic in the National Strategy on Biological Diversity. Such measures aim to reduce the degree to which species are endangered and to halt species diversity loss. Red Lists of endangered species are a key information source on the endangerment situation of assessed species. Since they were first published nearly 40 years ago, such lists have become increasingly important as a medium of record for species conservation. Today, they are widely known and versatile conservation tools. The German national Red Lists are updated on an approximately 10-year cycle. The endangered species indicator provides an at-a-glance measure of species endangerment in Germany based on the assessments in the Red Lists.

Indicator ►

The indicator assesses the degree to which species in selected species groups are endangered.

The indicator combines data on species endangerment from the German national Red Lists in a single measurement. The underlying data are the assessments of species in Red List categories, which are a set of threat levels ranging from least concern to extinction. The final index is a single figure representing the degree of endangerment for all assessed species.

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. This makes it possible to determine an indicator target for 2020. The target assumes a one-level improvement in the status of all currently endangered species.

It is planned in to supplement the main indicator with sub-indicators – for example a sub-indicator relating to the endangerment of species for which Germany has special responsibility for their conservation and which are targeted in the National Strategy on Biological Diversity to reach viable population sizes by 2020. Another sub-indicator could reflect the state of knowledge on species endangerment in Germany.

Composition ►

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

The underlying data for the indicator come from the German national Red Lists, which are compiled by panels of experts. The lists currently available for compilation of the indicator are the 1996 Red List of plants and fungi (Ludwig & Schnittler 1996) and the 1998 Red List of animals (Binot et al. 1998), together with the current edition of the national Red List of vertebrates (excluding marine fish) published in 2009 (BfN 2009a). For the time being, the endangered species indicator only includes those vertebrates other than marine fish for which endangerment data are available for 2009. The Federal Agency for Nature Conservation (BfN) plans to issue updated national Red Lists for additional species groups in 2010 and 2011. In the future, assessment of the indicator will also include data from these Red Lists.

Different species are given different weightings when compiling the indicator. The more severely endangered a species, the greater the extent to which it affects the value of the indicator. The compiled index results in a scale on which 0% would be attained if no species were endangered or extinct in the wild. At 100%, all assessed species would be extinct in the wild.

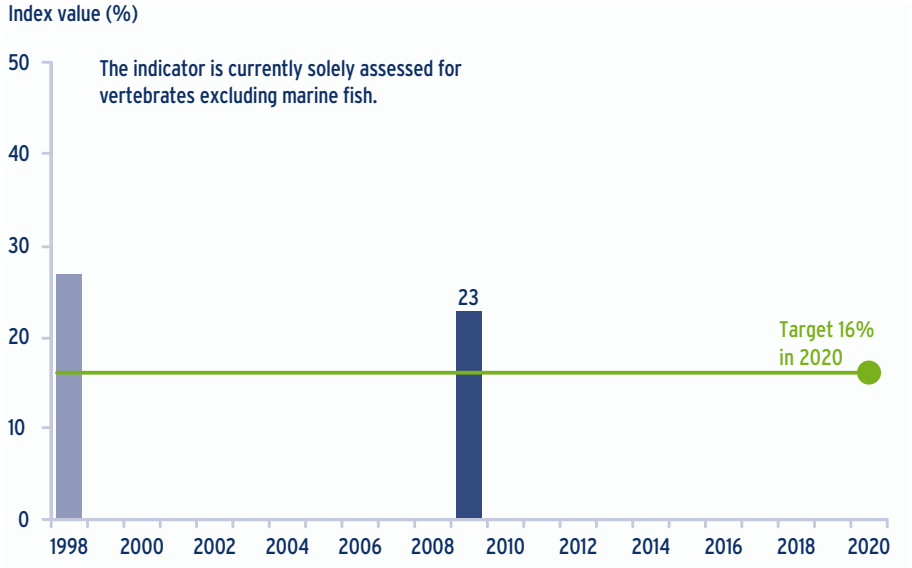
◄ Assessment

Calculated for the time being solely for vertebrates (excluding marine fish), the indicator stands at 23% in 2009. This figure will decrease if the threat to species lessens in the future. The current figure is still far removed from the 16% target. The index value has marginally improved compared with the 1998 Red Lists. Because there have been numerous methodological changes in the assignment of vertebrate species to Red List categories since 1998, however, direct comparison is only possible to a very limited extent.

It should be noted with regard to the assessment that the vertebrates included account for substantially less than 1% of all animal, plant and fungus species found in Germany. The species groups concerned also mostly consist of well-studied animal species, an above-average proportion of which have long been the focus of conservation efforts. It is therefore not possible to generalise and apply the indicator values shown here to the entire diversity of species in Germany together with their level of endangerment (Pauly et al. 2009). As more up-to-date Red Lists are published, a far larger number of species will be included in the index and there may be a marked change in what can be inferred about the assessment.

Individual action must be taken to ensure the survival of severely endangered species. Priority treatment should be given in this regard to endangered species for whose conservation Germany has a high or especially high degree of responsibility. For species conservation to be successful, it is additionally necessary to improve knowledge about all species occurring in Germany and their endangerment.

Endangered species



Current value still far from target range

Due to numerous methodological changes in the assignment of vertebrate species to Red List categories since 1998, direct comparison with the 1998 indicator value is only possible to a very limited extent.

Indicator value based on 1998 Red List
Indicator value based on 2009 Red List

Chart: BfN (2010)
Data: 1998 Red List, 2009 Red List

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 comprise the ranking of species in Red List categories.

Target
With a view to sustaining species diversity, an improvement in the status by one category level of endangerment is aimed at for all currently endangered species by 2020. This results in a target value of 16% for vertebrates excluding marine fish.

Core assessment
Calculated for the time being solely for vertebrates excluding marine fish, the indicator stands at 23% for 2009. Major species conservation efforts are needed to attain the target of 16% by 2020.

Conservation status of Habitats Directive habitats and species

German moorland sheep ('Heidschnucken') on heathland

The Habitats Directive promotes nature conservation in Germany in many ways, among other things by driving the creation of new protected areas and requiring more rigorous impact assessments and improvements in agri-environmental measures. The species and habitat types listed in its annexes represent a major cross-section of biodiversity in Germany and the EU. Reflecting the great importance of these protected species and habitats, which are found in a very wide range of ecosystems, 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 these species and habitats is central to measuring attainment of the EU biodiversity targets agreed for 2010 and likewise to measuring success under the National Strategy on Biological Diversity.

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 and species protected under the Habitats Directive. The 91 Annex I habitats and 272 of the 282 Annex II, IV and V animal and plant species were assessed for the first time in Germany for the 2007 National Report (BfN 2009b).

The National Strategy on Biological Diversity sets a target by 2020 of significantly improving the conservation status of all Habitats Directive habitats not previously at good conservation status, and likewise of significantly improving the conservation status of all coastal and marine species and habitats. 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 the annexes to the Habitats Directive. This corresponds with the Habitats Directive objective of maintaining or restoring all Annex habitats and species at good 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 previous 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% for 2020.

An indicator for the conservation status of Habitats Directive habitats and species is currently being developed at European level in preparation for a new EU biodiversity strategy to apply from 2010. So that target attainment for the German national indicator and the new EU indicator can be compared, the compilation method for the national indicator will be brought into line with the EU indicator when the latter is finalised, and the national target will be reviewed accordingly.

The target is formulated as follows in the National Strategy on Biological Diversity: "By 2020, all stocks of habitat types (in accordance with Annex I of the Habitats Directive), protected (§ 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)

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).

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 the Habitats Directive species and habitats for each of Germany's three biogeographical regions. Such assessments are performed every six years for the national report on implementation of the Habitats Directive. The first full report was drawn up in 2007 for the reporting period 2001-2006 (BfN 2009b). The next national report will be for the reporting period 2007-2012. 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. To compile the index, habitats and species are weighted by the assessment result and the size of their range in each biogeographical region as a percentage of the total range in Germany. Habitats and species found in more than one biogeographical region are included multiple times in the index.

◄ Assessment

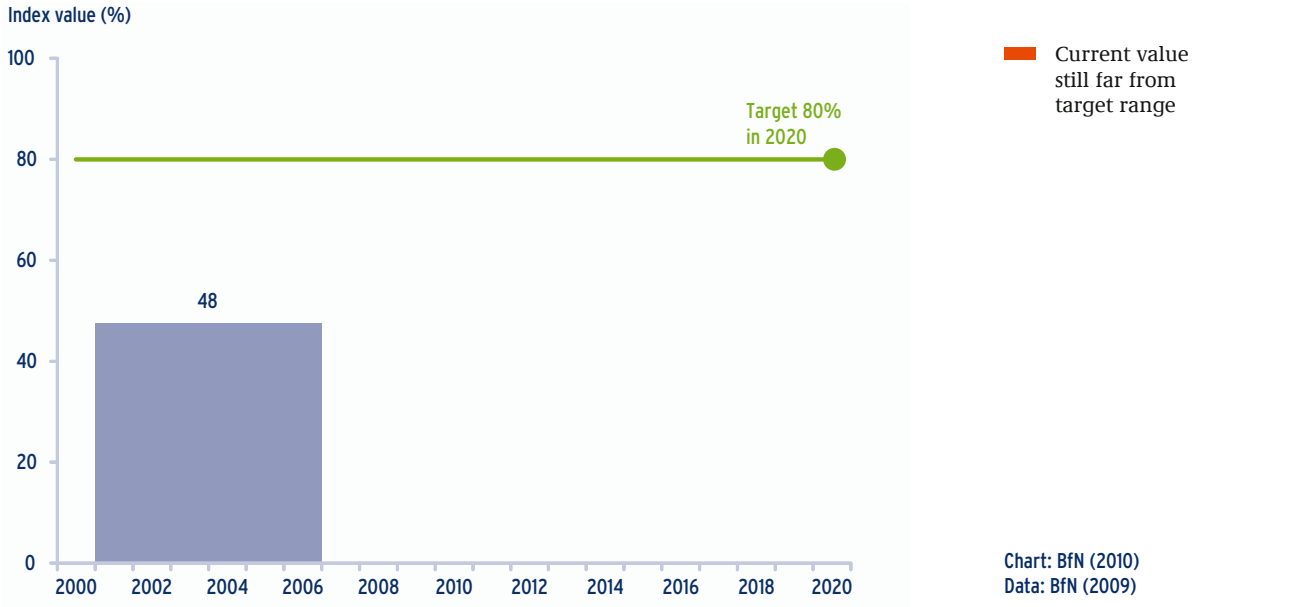
The indicator stands at 48% for the reporting period 2001-2006. 23% of habitats and species are classified as having favourable conservation status and the conservation status of 19% is unknown. The sub-indicators, each relating to a subset of habitats and species, range from 40% to 65%.

Sub-indicators	Value
Proportion of habitats and species assessed 'red', 'yellow' or 'green' or assigned to the category 'unknown'	'Red': 27% 'Yellow': 31% 'Green': 23% 'Unknown': 19%
Conservation status of habitats and species in specific vegetation formations	Coasts and marine waters: 51% Lakes and ponds: 46% Rivers and floodplains: 47% Peatlands: 44% Mountains: 65%
Conservation status of habitats and species dependent on or significantly influenced by farming (open farmland only, including land under historical farming practices)	40%
Conservation status of forest habitats and species	52%

The indicator shows 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 need for action is greater for habitats and species of farming-influenced ecosystems, peatlands, lakes/ponds and rivers/floodplains than for habitats and species of coasts and marine waters, forests or mountains. The implications are as follows:

- To achieve the objectives of the Natura 2000 protected area network, efforts must continue after completion of the site nomination process in order to improve the conservation status of Habitats Directive habitats and species.
- Numerous species and open countryside habitats continue to require special conservation efforts also outside of the Natura 2000 protected area network.
- Deciding suitable action, for example under Habitats Directive management programmes, species conservation programmes or agri-environmental measures, requires separate assessment of each habitat and species.
- The conservation status of many habitats and species depends on the type of land use outside of the area directly under conservation. Improvements in conservation status therefore require the combined effort of conservation practitioners and users of the land.

Conservation status of Habitats Directive habitats and species



Thematic areas
Main thematic areas: B 1.1 Biodiversity; B 1.2 Habitats; C1 Interlinked biotopes and networks of protected areas; C2 Species conservation; C6 Agriculture and silviculture

Definition
Index (percentage index) of conservation status, weighted by assessment result and geographical range, of the stocks of the 91 Habitats Directive habitat types and of the populations of the 272 Habitats Directive species in the three biogeographical regions of Germany

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

Core assessment
The index stands at 48% for the last reporting period (2001-2006). This is still far from the target. Considerable effort is therefore needed to improve the conservation status of most habitats and species.

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. Deliberate importation and accidental introduction of invasive alien species are considered to be globally the second largest source of threat to biodiversity after habitat destruction. Germany, however, has a long history of settlement and land use in the course of which people have brought about substantial exchange of species with other parts of the world. In the great 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, the overall threat level is compared to global standards far less than e.g. in the case of remote islands.

The Grass Carp (*Ctenopharyngodon idella*) is a species on the draft management list from the German Black List of Invasive Alien Species.

Alien species capable of endangering naturally occurring species and habitats mainly arrive in Germany by way of international transportation and trade. Alongside negative impacts in terms of 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).

The indicator assesses the number of invasive species that may pose a threat to ecosystems, habitats or species in Germany.

◄ Indicator

The indicator is based on the German Black List of Invasive Alien Species. This is a list of animal and plant species that have proven negative effects on the biodiversity of specific habitats in Germany or comparable regions. Species are grouped within the Black List into three sub-lists:

- Warning list (proven threat to biodiversity, species not yet found in Germany but invasive in comparable regions)
- Action list (proven threat to biodiversity, species found in small areas of Germany, effective immediate response measures known)
- Management list (proven threat to biodiversity, species found in small areas of Germany, no effective immediate response measures known or proven threat to biodiversity, species found in large areas of Germany, response measures effective only in isolated instances)

Two sub-indicators are reported. The first is the absolute number of species on the **action list** in the Black List of Invasive Alien Species. This is a measure of the urgency with which immediate action needs to be taken against invasive alien species. The second sub-indicator is the absolute number of species on the **management list** in the Black List of Invasive Alien Species. This reflects the level of threat to ecosystems, habitats and species from invasive alien species in Germany.

For both the action list and the management list, the objective aimed for is to prevent the number of listed invasive alien species from increasing. For the action list, if the action taken is successful, it is possible for the number of species on the list to fall to zero. This outcome is not possible for species on the management list, which in general are already widespread.

"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)

Combating Giant Hogweed
(*Heracleum mantegazzianum*)

The German federal government aims to act as follows to protect biodiversity from adverse impacts of invasive alien species (BMU 2007):

- To incorporate measures addressing known invasive species in management plans (p. 28);
- To avoid introducing invasive alien species, particularly in aquatic habitats (marine and freshwater) (p. 34, 35 and 37);
- To perform monitoring, early detection and prevention (p. 66);
- To apply nature conservation and plant health legislation (p. 67);
- To develop recommendations on handling invasive alien species (p. 68).

Composition ►

The two sub-indicators are provisionally based on a draft (March 2010) action list and management list of vascular plants and fish compiled for the Black List of Invasive Alien Species by the Federal Agency for Nature Conservation, this currently being the sole available source of underlying data. In addition, an online list of invasive alien species among benthic macrofauna (http://www.aquatic-aliens.de) was analysed. The species in this list all qualify for the management list. The numbers of species on the action list and management list are each totalled for all species groups taken into account. The Federal Agency for Nature Conservation will publish Black Lists in future both for the species groups mentioned and for additional species groups. These will supplement the underlying data for the two sub-indicators.

◄ Assessment

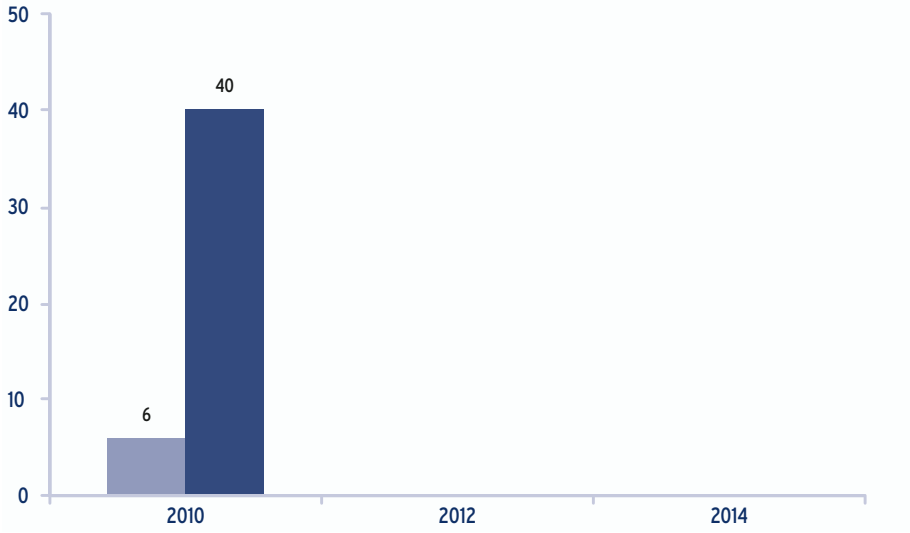
The two sub-indicators are provisionally compiled for 2010 based on the draft Black Lists for three species groups (vascular plants, fish and benthic macrofauna). They currently show 40 invasive alien species on the Black List's management list. The action list contains a total of six invasive alien species for which immediate action is needed.

It may be of interest in the future to present an analysis of reasons why species have been removed from the list. Removal because a species has been eliminated indicates successful immediate action. Reclassification from the action list to the management list indicates that immediate action has been unable to prevent a species from spreading, or that none has been taken. To ensure that the correct interpretation is arrived at for any changes in the sub-indicator stating the number of action list species, the reasons why species are removed from the list must be known and analysed.

In its National Strategy on Biological Diversity, the German federal government has proposed a range of measures to reduce the impact on biodiversity from invasive alien species. Under the new Federal Nature Conservation Act (BNatSchG) in force since 1 March 2010, special importance must be attached to prevention in order to counter threats to ecosystems, habitats or species from invasive alien species. Any invasive alien species reaching Germany must be prevented from settling and spreading further by early detection and immediate action.

Invasive alien species

Number of species on the draft action list and on the draft management list in the Black List of Invasive Alien Species



Data were included from draft Black Lists for the following species groups: Vascular plants, fish and benthic macrofauna.

Number of action list species

Number of management list species

Chart: BfN (2010)
Data: BfN (2010), http://www.aquatic-aliens.de

Thematic areas
B 1.1.2 Species diversity
C 3 Biosafety and preventing the adulteration of fauna and flora

Definition
Number of species in the Black List of Invasive Alien Species, stated separately for the action list and the management list

Qualitative target
The number of species on the two lists is to be minimised.

Core assessment
Biodiversity is endangered in 2010 by 40 species on the draft management list from the Black List of Invasive Alien Species. Immediate action must be taken against six species on the draft action list.

Protected areas

'Obere Ahr' Nature Conservation Area

Designation of endangered and valuable sites as protected areas is a key instrument in the nature conservation toolkit. Germany has various protected area categories subject to widely differing legal requirements.

In a landscape shaped almost everywhere by human land use (notably agriculture, forestry, settlement and transport), protected areas provide essential retreats for plant and animal life. Strict conservation rules apply in nature conservation areas and national parks to safeguard the conservation and development of rare and endangered species and habitats. Moreover, an important aspect of national parks is their large size. They have the objective of allowing nature to run its course as far as possible without human interference on the major part of their territory. 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. Nature conservation areas and national parks are vital instruments in the conservation of biodiversity in Germany. The area of land designated in these two protected area categories is therefore used as an indicator for protected areas policy under the National Strategy on Biological Diversity.

The indicator assesses the designation of strictly protected areas as a measure of protected areas policy.

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).

The European Natura 2000 protected area network is a key element of protected areas policy in Germany. Its purpose is the maintenance or restoration of a favourable conservation status of species and habitat types of Community importance. Natura 2000 sites cover 15.3% of the German land surface. They are gradually being brought under protection, although in line with the conservation objectives defined for each site, only some sites are designated as strictly protected areas (nature conservation areas, national parks, and core areas or buffer zones of biosphere reserves).

Indicator ►

The Protected areas indicator assesses the total size of strictly protected areas in Germany. The area of land designated as nature conservation areas (NCAs) and national parks (NLPs) is expressed for this purpose as a percentage of the German land surface. Core areas and buffer zones of biosphere reserves (BRs) are included if designated as NCAs or NLPs.

The German federal government sets itself various targets relating to protected areas in the National Strategy on Biological Diversity. By 2010, the country aims to have a representative and functional habitat network covering 10% of its territory. A further target is for nature to be able to run its course undisturbed by man on 2% of the German territory by 2020. Completion of the European Natura 2000 network of protected areas is planned for 2010. The designation of strictly protected areas (nature conservation areas and national parks) goes a significant way towards achieving these goals.

'Eifel' National Park

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."

◄ Composition

The indicator represents the total size of strictly protected areas reported annually by the German federal states since 2000. Figures are stated separately for NCAs and NLPs. Only one place in Germany – the 'Unteres Odertal' National Park – has sites that are designated as both NCA and NLP land at the same time. For the purposes of this indicator, these sites are counted as NLP land. The area of land comprising core areas and buffer zones of BRs that are designated as NCAs or NLPs is not stated separately.

"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)

'Insel Vilm' Nature Conservation Area in the 'Südost-Rügen' Biosphere Reserve

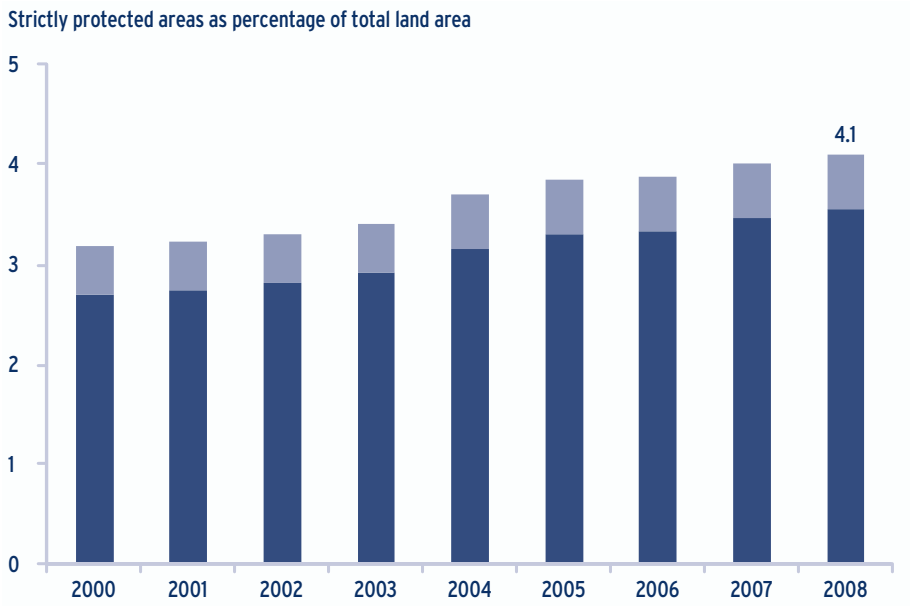
Assessment ►

The total size of strictly protected areas increased continuously from 1,129,225 ha in 2000 to 1,455,695 ha in 2008. This represents 3.2% of the German land area in 2000 and 4.1% in 2008. While the total size of NCAs has grown steadily since 2000, the entire increase in the area designated as NLPs took place between 2003 and 2004 on the creation of the 'Eifel' National Park in the state of North Rhine-Westphalia and the 'Kellerwald-Edersee' National Park in the state of Hesse.

The increase in the total size of strictly protected areas largely reflects national implementation of the Natura 2000 network. As the process of bringing Natura 2000 sites under statutory protection is not yet complete in Germany, the total size of strictly protected areas is likely to increase in the future. Designation of protected areas is carried out by the German federal states. The federal government can support the process (for example by funding large-scale nature conservation projects).

As well as requiring formal designation, protected areas also need proper care and management in accordance with the nature conservation objectives laid down for them. Attention must also be paid to ensuring that protected areas are properly linked in an ecological network. It is not yet possible to make a comprehensive statement about the quality of all strictly protected areas in Germany. Work has commenced, however, on an evaluation process for German national parks and on a national survey of the conservation status of habitat types and species protected under the Habitats Directive (see the 'Conservation status of Habitats Directive habitats and species' indicator).

Protected areas



Statistically significant trend towards target

The 'Unteres Odertal' National Park contains areas designated both as NCA and NLP. These areas are counted here as NLP.

NLP
NCA

Chart: BfN (2010)
Data: German federal states (2009)

Thematic areas
B 1.1.3 Diversity of habitats
C 1 Interlinked biotopes and networks of protected areas

Definition
Total size of nature conservation areas (NCAs) and national parks (NLPs), and of biosphere reserve (BR) core areas and buffer zones designated as NCA or NLP, as a percentage of the German land surface

Qualitative target
The designation of strictly protected areas 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 strictly protected areas increased between 2000 and 2008 from 3.2% to 4.1% of the German land surface.

Ecological status of surface waters

Near-natural river

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 particularly by effluent from sewage works and industry and by run-off from nearby farmland. Wide-ranging efforts to clean up lakes and rivers have improved biological water quality overall during the last few decades. While effluent pollution has declined and numerous animals and plants have returned to cleaner waters, other major deficits still remain. Engineering works, river straightening and the draining of floodplains result in structural impoverishment, loss of species diversity and changes in natural flood regimes. On average, watercourses have an artificial barrier preventing the passage of organisms and sediment every 2 km. These radical changes combined with nutrient inputs from agriculture are the main pressures on surface waters today.

The EU aims to establish an integrated approach to the conservation and use of European surface waters in the Water Framework Directive (Directive 2000/60/EC of 23 October 2000) and the Marine Strategy Framework Directive (Directive 2008/56/EC of 17 June 2008). These adopt an objective of achieving good ecological and chemical status. This indicator reports good ecological status, which is defined as no more than slight deviation from natural conditions.

The indicator provides information on the ecological status of rivers, streams, lakes, transitional waters and coastal waters.

The indicator reports the proportion of surface water bodies – sections of rivers, streams, lakes, transitional waters and coastal waters – having good or high ecological status as a percentage of all assessed surface water bodies. Recognising that the composition of aquatic communities reflects all factors affecting a given water type, water bodies are assessed under the Water Framework Directive with reference to water-living organisms.

In accordance with the settings of the Water Framework Directive and with the objectives of the German National Strategy on Biological Diversity, the target is at least good ecological status in basically all water bodies by 2015. For heavily modified waters and for artificial waters, the target is what is termed good ecological potential. This recognises that ongoing use makes it impossible to restore all naturally occurring habitats in such waters. It should be noted that the Water Framework Directive permits exemptions from target attainment, including extensions of the timescale up to 2027.

◄ Indicator

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

"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 surveys of waters in accordance with the Water Framework Directive. The surveys assess the ecological status of individual sections of rivers, lakes or coastal waters. The basic survey unit is the water body. Water bodies are considered to be 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 km² and lakes of at least 50 ha. Almost 9,900 water bodies are distinguished in Germany (9,070 in rivers and streams, 710 in lakes, 5 in transitional waters and 74 in coastal waters).

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)

The ecological status of a water body is ranked according to how far it deviates from the natural state in terms of composition and abundance of the species typical for the respective water habitat. 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 in management plans. The deadline for presentation of the first plans was 22 December 2009. The first management cycle runs to December 2015. Two further six-year cycles will then follow. A selection of waters are reassessed annually in each cycle. New data on the ecological status of all German waters are therefore available every six years beginning in 2009.

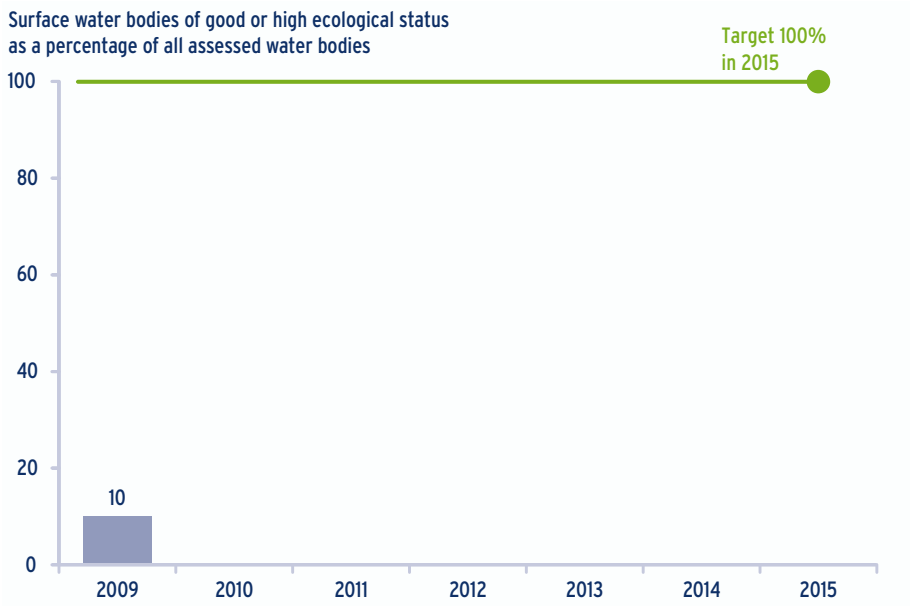
Macrozoobenthos:
Bottom-living invertebrates visible to the naked eye
Macrophytes:
Water plants visible to the naked eye
Phytobenthos:
Bottom-living algae
Phytoplankton:
Floating algae

Caddisfly larva

◄ Assessment

Applying the classification standards of the Water Framework Directive, only 10% of German water bodies attained good or high ecological status in 2009. This result is dominated by the assessment for running waters (9% 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 39% attaining good or high ecological status. The situation was worse for coastal and especially transitional waters, where almost all water bodies did not attain good ecological status. The most frequent reasons for rivers and streams failing to attain good 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 nutrient inputs, largely from farming. These adverse impacts are reflected in massive changes in the natural aquatic communities. The most frequent reason for lakes, transitional waters and coastal waters failing to attain good ecological status is nutrient pollution.

Ecological status of surface waters



Current value still very far from target range

Chart: BfN (2010)
Data: UBA (2010), WasserBLIcK reporting portal (http://www.wasserblick.net) and BfG (2010)

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 – having good or high ecological status as a percentage of all assessed water bodies

Target
Basically, 100% of the water bodies attain good or high ecological status by 2015.

Core assessment
Only 10% of water bodies attained good or high ecological status in 2009. The most frequent causes of impairment are changes in the structure of water bodies and large nutrient inputs from agriculture.

Status of floodplains

Danube floodplain near Neuburg

Rivers and their floodplains are very important to the conservation of biodiversity. They offer 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 therefore 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 is the first publication to present the status of German river floodplains on a nationwide basis. The data can be used to examine the targets in the National Strategy on Biological Diversity relating to 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% enlargement of river floodplain retention areas).

The indicator provides information on the status of floodplains as a habitat for plants and animals.

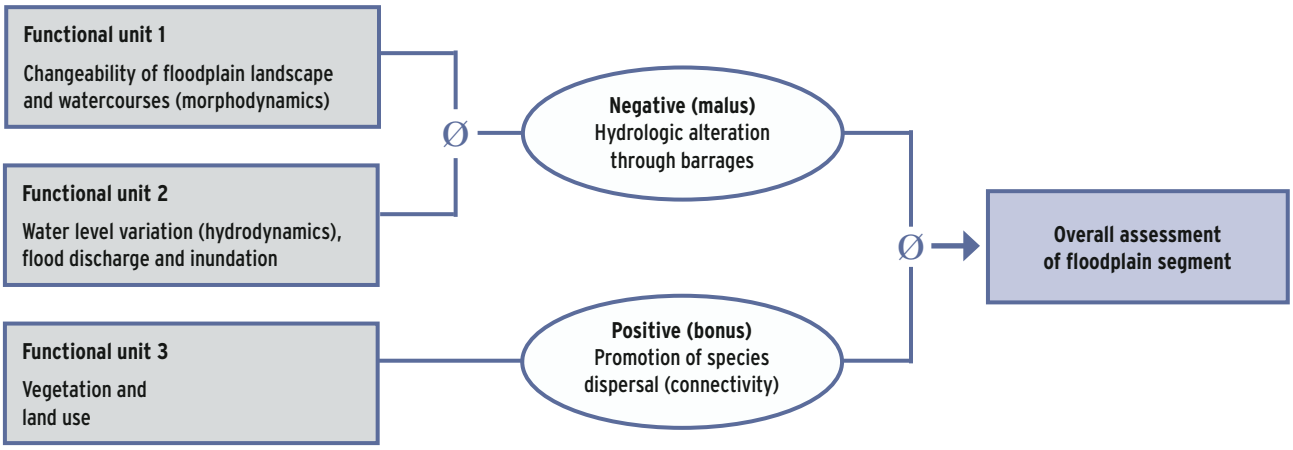
Indicator ►

The newly developed 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 indicator's underlying data are from the Floodplains Status Report (Auenzustandsbericht) 2009. The area surveyed consists of the portions of river floodplains that are still capable of being inundated today, beginning in each case at the point on a river where its catchment area exceeds 1,000 km². Tidal reaches are not included. The survey area consequently covers the larger floodplains of all in all 79 rivers (10,276 kilometres of river and a total of 15,533 km² 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 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 including river structure data and land use data from the Digital Landscape Model (DLM25).

"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)

The Common Sandpiper (*Actitis hypoleucos*), a characteristic floodplain species

The floodplain status assessment distinguishes five status classes ranging from 'nearly 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 0% (all floodplains totally modified) to 100% (all floodplains in a near-natural state).

Class	Description	Weighting
1	Nearly natural	16
2	Slightly modified	8
3	Considerably modified	4
4	Severely modified	2
5	Totally modified	0

Status classes of floodplains

- Nearly natural (1)
- Slightly modified (2)
- Considerably modified (3)
- Severely modified (4)
- Totally modified (5)
- Not assessed

Floodplain segments with limited data availability are shown in pale colours.

Status of floodplains in Germany (Brunotte et al. 2009)

◄ Assessment

The German floodplain status index for 2009 stands at 19%. This reflects the severe overall impairment of floodplains in Germany and corresponds to an average rating of all floodplain segments between 'considerably modified' (Class 3) and 'severely modified' (Class 4). Only about 10% of segments were assessed as 'nearly natural' (Class 1) or 'slightly modified' (Class 2).

With regard to catchment areas, there are signs of a north-south gradient (see adjacent map). While small rivers flowing into the Baltic Sea had lost only about a third of their floodland and in most cases their floodplains were only slightly modified (indicator value of 42%), especially in the Danube catchment area (indicator value of 21%) and Rhine catchment area (indicator value of 13%), most floodplains showed considerable to total modification. These rivers in particular have undergone major changes to their river flow, floodplain and flood discharge regimes.

The main reasons for the overall 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 German federal government accordingly aims by 2020 for a marked improvement in the status of watercourses and floodplains and to take action to enlarge natural flood retention areas.

Status of floodplains

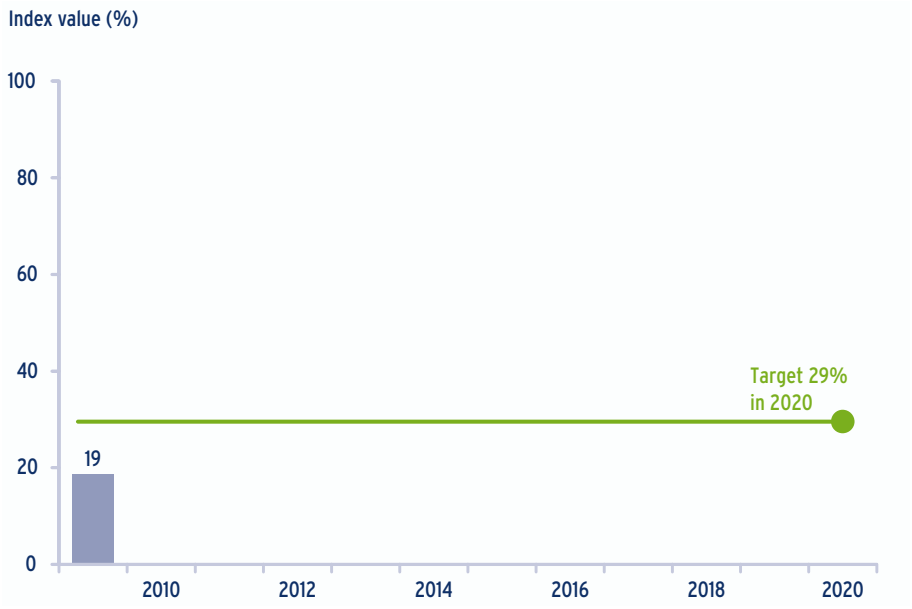


Chart: BfN (2010)
Data: Planungsbüro Koenzen, University of Cologne (2009)

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 points improvement in status of floodplains nationwide by 2020 compared with the indicator value in 2009 (increase to 29%)

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

2.2 Settlement and transport

Urban development and transport in the Rhine-Ruhr metropolitan region (picture: Düsseldorf)

Increase in land use for settlement and transport

Undeveloped land is a finite resource in strong demand. There are many competing potential uses for undeveloped land, including farming and forestry, settlement and transport, nature conservation, resource extraction and energy generation. The area of land used for settlement and transport in particular is steadily increasing. Undeveloped land is needed to help secure ecological services for humankind, for biodiversity conservation and for recreation in the countryside as well as in green urban spaces. Land used for settlement and transport is lost to farming, forestry and more natural development of the landscape.

Greenfield housing development

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 land close to nature together with its biodiversity. Site development for construction in the vicinity of settlements and outside of existing urban centres also generates more traffic and more dissection of the landscape. This leads to secondary impacts such as noise and pollution, and requires higher investment to provide the necessary infrastructure. 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 in the National Strategy on Biological Diversity. It has also been reported recently in the Indicator Report 2010 under the National Sustainability Strategy (Statistisches Bundesamt 2010).

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. The indicator covers three different areas: i) land use for buildings, green spaces and production (excluding resource extraction), ii) land use for recreation and cemeteries, and iii) land use for transport. 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% of land used for settlement and transport. Recreational land also includes some sealed land, such as sports fields.

On adopting the National Sustainability Strategy in April 2002, the German federal government followed the recommendation of the German Council for Sustainable Development in setting a goal for new land use for settlement and transport of an average daily maximum of 30 ha by 2020. Changes in the indicator show whether it will prove possible to limit the spread of settlement and transport area at the expense of more natural habitats.

"In its National Sustainability Strategy, the German Government has set itself the target of reducing the use of new land for human settlements and transport to a maximum of 30 ha per day by 2020."
(BMU 2007: 78)

Composition ►

The indicator covers land use for:

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

The data comprise statistics on land use for settlement and transport from the automated official real estate cadastres, analysed by statistical offices of the federal states and collated by the Federal Statistical Office. To obtain a concrete 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 – mostly methodological changes in the official real estate cadastres – 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).

On average, over 20 ha a day is newly taken up solely for transport infrastructure.

Assessment ►

The figures for the four-year rolling average show that the rate of increase in land use for settlement and transport has fallen since 2000. The four-year rolling average dropped from 129 ha per day in 2000 to 94 ha per day in 2009. The 78 ha per day increase in land use for settlement and transport in 2009 consisted of 18 ha per day for buildings, green spaces and production, 32 ha per day for recreation and cemeteries, and 28 ha per day for transport. The relatively large figure for recreational land in the increase in land use for settlement and transport is mainly due to the methodological changes in the official cadastres mentioned above.

The increase in land use for transport remained at a high level throughout the entire assessed period. Figures vary between 20 and 28 ha per day. The area of land covered by roads increased by 5.9% between 1992 and 2008.

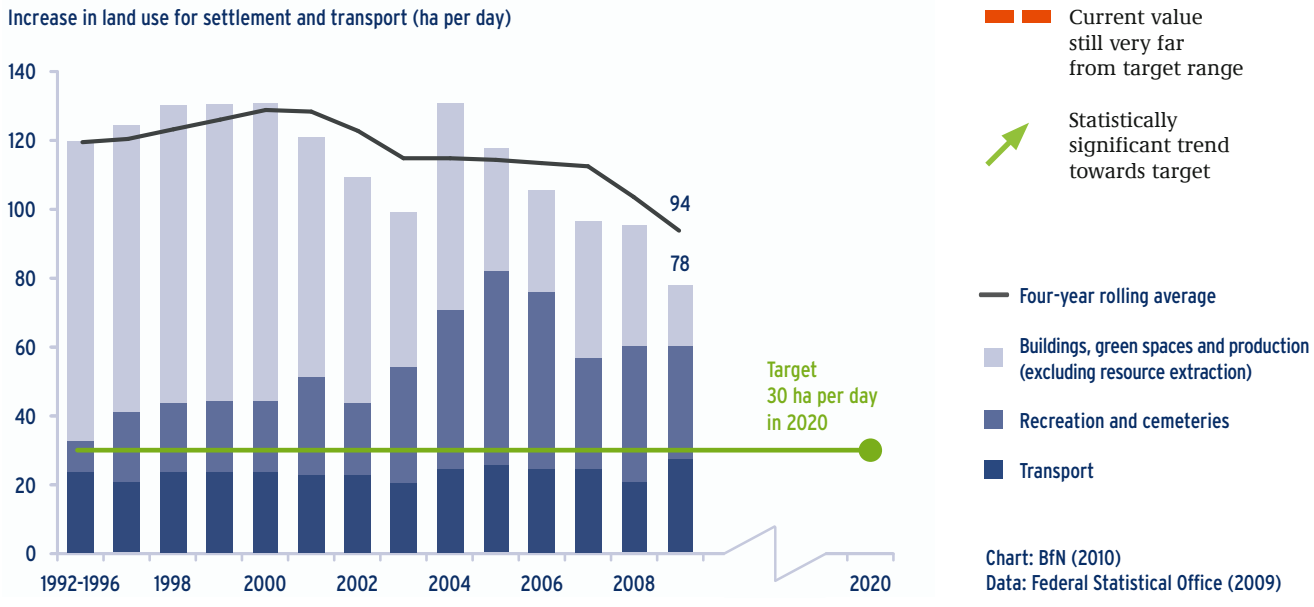
Targets adopted by the German federal government with regard to the increase in land use for settlement and transport include (BMU 2007: 51):

- "To guide land use in favour of restoring usability, increasing the density of use, and other brownfield development measures by adopting an overall ratio of 3 : 1 brownfield development to greenfield development
- 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"

Vehicle kilometres increased even more rapidly, by 17% in the same period, showing that traffic on existing roads has continued to become heavier at the same time and no trend reversal is to be expected. Another important finding with implications for the future is that land use for private residential building grew by 28.3% between 1992 and 2008. This primarily reflects a significant increase in living space per capita, which grew by 18.5% between 1992 and 2006.

Keeping the indicator trend at a level equal to the average annual trend of recent years would not be enough to secure the goal of reducing the increase in land use for settlement and transport to a maximum of 30 ha per day by 2020. Consequently, policy instruments to reduce the increase in land use must still be systematically reinforced for all sectors of land use for settlement and transport. Settlement development planning needs to place greater emphasis on the reuse of abandoned land including former industrial sites. Brownfield development inside settlements ('internal development') should be given priority over greenfield development outside settlements ('external development'). The increase in land use for transport needs to be constrained in future in line with the objectives of the National Strategy on Biological Diversity. Action is also necessary to raise public awareness of the need to limit the increase in land use for settlement.

Increase in land use for settlement and transport



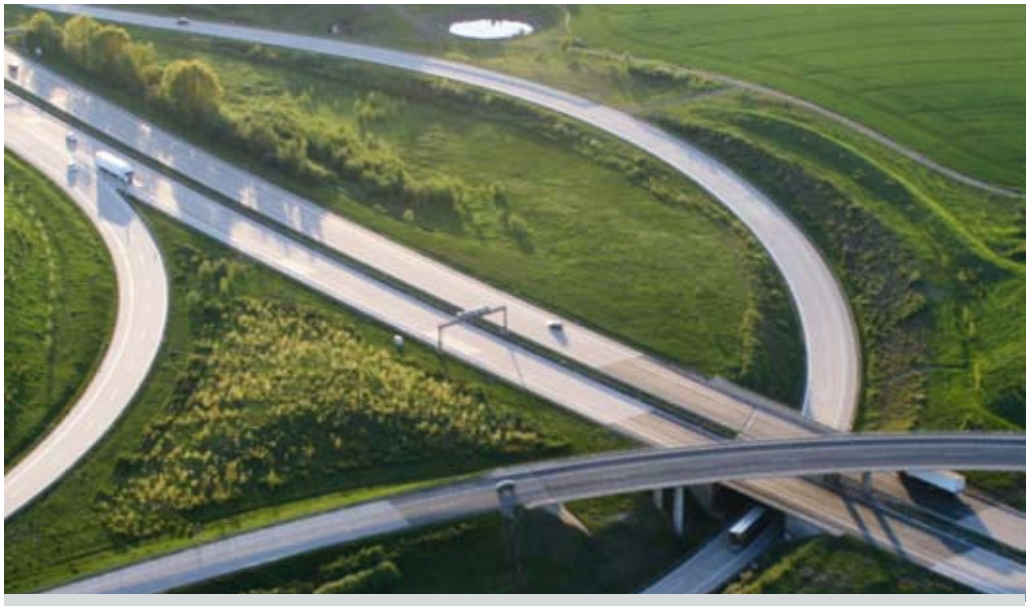
Thematic areas
B 2.7 Land use for settlement and transport
C 9 Settlement and transport

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 2020.

Core assessment
The four-year running average fell from 129 ha per day in 2000 to 94 ha per day in 2009. Despite the positive trend, the current value is still very far away from the target. Instruments to reduce the increase in land use must consequently be reinforced and systematically applied.

Landscape dissection



Federal motorway intersection

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 km² in size (ULTA ≥ 100 km²) that are not fragmented by transport networks. The assessment of the landscape dissection impact of roads also considers traffic volume, as roads with heavier traffic pose greater barriers to wildlife.

The indicator assesses the adverse effects of landscape dissection on biodiversity.

The concept of undissected low-traffic areas provides a very good quantitative measure of large-scale landscape dissection. It does not, however, allow detailed conclusions to be derived about the function, quality and dissection of individual habitats within identified undissected low-traffic areas. Such areas are located in less densely settled regions with less transport infrastructure and therefore indicate a more natural state of the landscape than heavily dissected areas. They are also subject to lower levels of permanent transport-related emissions such as noise. Proximity to nature of habitats and lack of transport-related disturbances are factors that have a positive overall effect on the presence of many species and are of key importance to biodiversity conservation.

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 equal-ranking sub-indicators. The first sub-indicator states the total sum of undissected, low-traffic areas with a minimum size of 100 km² 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 condition of heavily fragmented landscapes and depict gradual changes in the degree of dissection of already heavily fragmented landscapes.

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

In the National Strategy on Biological Diversity, the German federal government has set a target of holding constant the current proportion of undissected, low-traffic areas of at least 100 km² in size as a percentage of the total German land area. As no figure is available for 2007 when the strategy was adopted, the figure for 2005 (25.4%) is used for the target instead.

◄ Composition

Data on transport routes are taken from the national Digital Landscape Model (DLM 250) and supplemented with traffic census data from the Federal Highway Research Institute (BASt) and the German federal states. 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. Detailed traffic census data are only included for 2000 onwards. Figures from earlier analyses cannot therefore be compared with more recent figures.

◄ Assessment

The indicator has been compiled for two points in time based on data for the years 2000 and 2005. The assessment shows that Germany lost 18 undissected low-traffic areas with a minimum size of 100 km² due to new transport routes and growth of settlements between 2000 and 2005. Such undissected areas consequently decreased from 26.5% to 25.4% of the total land area of Germany. The effective mesh size (M_{eff}) of an imaginary regular dissection grid decreased correspondingly from 84 km² to 81 km².

Germany has a well-developed transport infrastructure and the focus of future investment spending should be on maintenance. If it is feasible to focus investment spending on the network of existing transport routes, it will be possible to hold constant the current proportion of undissected low-traffic areas. This strategy has already been incorporated into the current Federal Traffic Route Plan (Bundesverkehrswegeplan) 2003.

Red Deer (*Cervus elaphus*) need corridors linking their summer and winter ranges.

In action area C9, 'Settlement and transport', the German federal government committed to a wide range of measures (BMU 2007: 79), 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
- Continued development of the indicator 'undissected low-traffic areas' with due regard for European developments and regular documentation every 5 years

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

The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) and the Federal Ministry of Transport, Building and Urban Development (BMVBS) are also developing a federal re-crosslinking programme that lists priority sections in the federal trunk road system as a basis for building wildlife crossings at key points in the network of ecological corridors. Under the German federal government's Economic Stimulus Package II, approximately €80 million is to be invested in building 18 wildlife bridges by the end of 2011 as an advance payment for the federal re-crosslinking programme.

The German federal government has set itself the following goals in this regard (B 2.8 Mobility): "New land transport routes (primarily road, waterways and rail) indicate adequate levels of ecological passability (e.g. fish ladders in watercourses, 'green bridges' (wildlife crossings) on land transport routes). By 2020, as a general rule, the existing transport routes will no longer cause any significant impairments to the system of interlinked biotopes." (BMU 2007: 51)

Wildlife bridge over the A20 federal motorway in Mecklenburg-Western Pomerania

Under the National Strategy on Biological Diversity, it is to be assessed whether and to what extent measures to avoid or reverse effects of dissection (such as wildlife bridges or underpasses) can be taken into account in the future, e.g. in a further sub-indicator (BMU 2007: 129).

A wide range of measures are listed in action area C 9, 'Settlement and transport' (BMU 2007: 79), including:

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

Landscape dissection

Undissected low-traffic areas with a minimum size of 100 km² as a percentage of the German land area

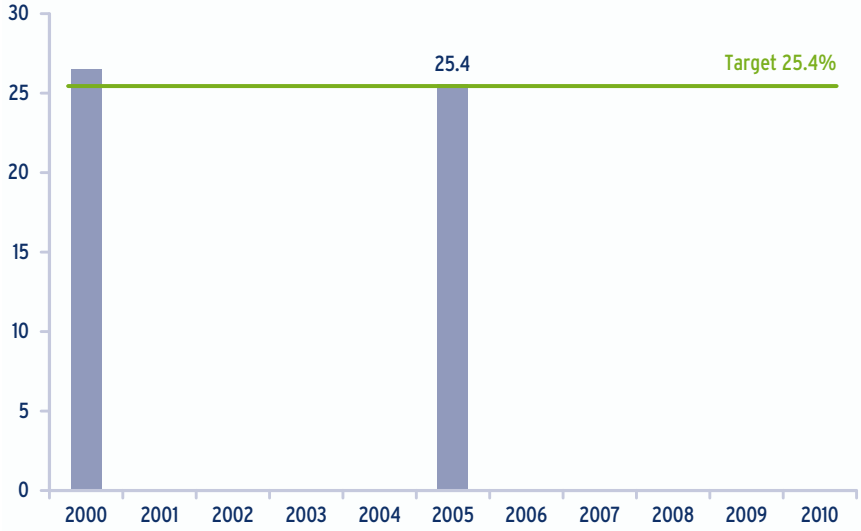


Chart: BfN (2010)
Data: Federal Agency for Cartography and Geodesy (2006), Federal Highway Research Institute (2005), German federal states (2005)

Thematic areas
B 2.8 Mobility
C 9 Settlement and transport

Definition
Proportion of undissected low-traffic areas with a minimum size of 100 km² as a percentage of the German land area

Target
The proportion of undissected low-traffic areas with a minimum size of 100 km² remains as in 2005 (25.4%).

Core assessment
The proportion of undissected low-traffic areas with a minimum size of 100 km² decreased from 26.5% to 25.4% between 2000 and 2005. In the same period, the effective mesh size (M_{eff}) decreased from 84 km² to 81 km². Investment is to be focused in future on the network of existing transport axes.

2.3 Economic activities

Agricultural landscape

Agri-environmental measures

Farmland offers habitats for numerous animal and plant species typical for the open countryside, provided that use is made of sustainable farming practices that ensure the conservation of biodiversity and environmental integrity. 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.

Richly flowering field margin

The European Union provides financial resources for agri-environmental measures through the European Agricultural Fund for Regional Development (EAFRD), which forms the second pillar of the Common Agricultural Policy (CAP). The aim is to reward environmentally sound forms of agricultural production sustaining nature beyond compulsory minimum requirements of good agricultural practice and cross-compliance. In federal Germany, this second pillar of the CAP is implemented by the federal states (Länder). Agri-environmental measures have to be partly funded by the federal states to qualify for EU co-financing. The German federal government may also provide co-financing under the Programme on Improving Agrarian Structures and Coastal Protection (GAK, Gemeinschaftsaufgabe 'Verbesserung der Agrarstruktur und des Küstenschutzes').

The indicator provides information about subsidies for agri-environmental measures.

Alongside agri-environmental measures, 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. Moreover, funding is available in Germany under the GAK for measures to conserve genetic resources, locally endangered animal breeds and regionally adapted traditional crop species and varieties threatened by genetic erosion. A number of German federal states also have agri-environmental schemes that are funded entirely out of domestic sources. It is difficult or partly impossible to separate out the funding granted for biodiversity under the additional EAFRD co-financing options. The indicator therefore focuses on agri-environmental measures.

Financial resources for agri-environmental measures are intended to promote among other things traditional and environmentally sound forms of agriculture that sustain nature (BMU 2007: 73).

◄ Indicator

The 'Agri-environmental measures' indicator reports the total agricultural land area supported by agri-environmental measures and the amount of funding granted. The National Strategy on Biological Diversity calls for maintaining traditional forms of agriculture and promoting environmentally sound agricultural practices that sustain nature.

Composition ►

Data on the area of agricultural land under agri-environmental measures and on EU, national and federal state subsidies are compiled annually and kept by the German Federal Ministry of Food, Agriculture and Consumer Protection (BMELV). Since 2007, in accordance with EU requirements, the federal states have reported actual payments rather than the financial resources made available as in previous funding periods. Measures are only included in the indicator if they unequivocally come under the heading of environment and nature conservation.

Assessment ►

Funds granted increased from 1996 to 2005. Funds made available peaked at €791 million (2005) and then dropped back to €752 million (2006). The start of the new funding period (2007-2013) has brought a further decrease in funds paid out to €603 million (2007). The area supported comprised some 4.8 million ha of farmland in 2007. Changes in the area supported and changes in funding diverged since 2005. This is partly because agri-environmental measures have a five-year minimum contract term and new measures were delayed at the start of the funding period by late approval of programmes by the European Commission. There have also been sharp cuts in certain parts of the EU rural development funds for Germany in the current funding period. This is noticeable among other things in a marked reduction in premiums for contract-based nature conservation and agri-environmental programmes, in the decision of German federal states to restrict funding in some cases to certain areas/sites (e.g. Natura 2000 sites) or to further tighten such funding restrictions, and in specific measures being taken out of federal state funding programmes. Different federal states also set very different priorities in rural development. While some place greater emphasis on agri-environmental measures in their programmes, other federal states mainly focus on making farms more competitive or on Axis 3 rural development measures (e.g. diversification, village renewal, rural infrastructure, and integrated development approaches to improve the quality of life in rural areas).

The National Strategy on Biological Diversity identifies the following measures for implementation in farming and forestry (BMU 2007: 73):

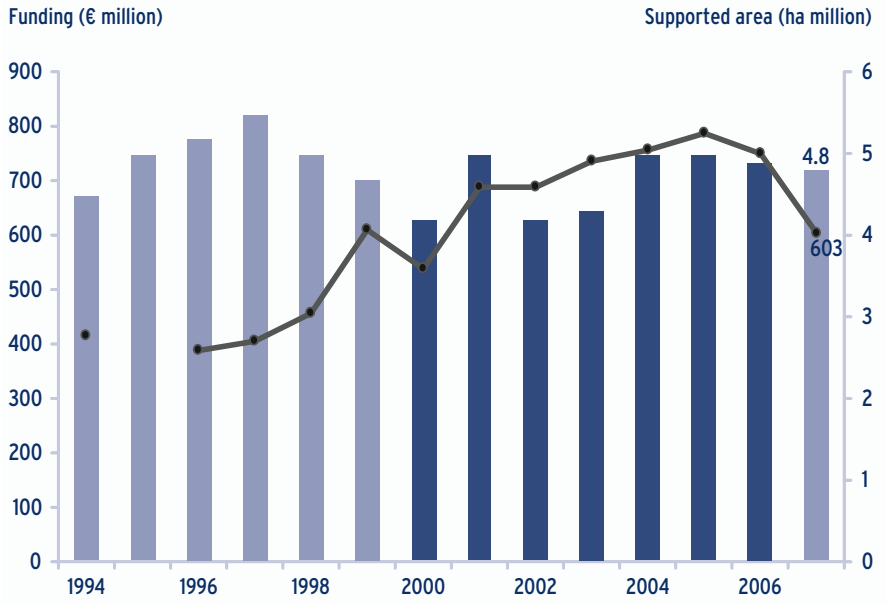
- At EU/national level: "Review of agricultural and environmental policy measures with a view to sustainability and financially viable opportunities to further improve nature compatibility within the context of EU agricultural support and national/European agricultural and environmental policy"
- At federal state/municipal level: "More widespread promotion of traditional and eco- and nature-friendly forms of agriculture and forestry"

Landscape management by grazing with sheep in the 'Fröttmaninger Heide', a Special Area of Conservation according to the Habitats Directive

Premiums for many agri-environmental measures increased again, in some cases significantly, following a review in 2009. It is currently not possible to say what effect this will have on the area supported or the amount of funding. An increase is to be expected, however.

To attain the objectives of the National Strategy on Biological Diversity and so that forms of agricultural land use sustaining nature can be appropriately rewarded, it is necessary to improve the Common Agricultural Policy (CAP), a process already started by the Health Check.

Agri-environmental measures



No trend can be identified due to limited comparability between time series.

Chart: BfN (2010)
Data: BMELV (2009)

Thematic areas
B 2.4 Agriculture
C 6 Agriculture and silviculture

Definition
Total supported area under agri-environmental measures and funding granted for this area with positive effects for nature conservation and environment protection

Qualitative target
Promotion of traditional and environmentally sound forms of agriculture that sustain nature with the objective of significantly enhancing biodiversity in the agricultural landscape

Core assessment
After a slight increase in the previous funding period, the start of the current funding period has brought a decrease in funding. Funding needs to be directed to a greater extent towards the conservation and sustainable use of biodiversity.

Organic farming

Organically cultivated apple

The indicator provides information about the area of organically farmed land that contributes towards the conservation of biodiversity.

Over half 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 the interdiction of synthetic nitrogen fertilisers and chemical synthetic plant protection products help protect groundwater and surface waters.

Organic farming aims to achieve largely closed nutrient cycles in agricultural production in order to maintain ecosystem functions, to conserve non-renewable energy and mineral resources, to avoid pressures on the environment and to reduce soil acidification and nutrient immissions in waters.

The 'Organic farming' indicator was developed for the National Sustainability Strategy and incorporated in the National Strategy on Biological Diversity. It has also been reported recently in the Indicator Report 2010 under the National Sustainability Strategy (Statistisches Bundesamt 2010). The indicator is also reported in modified form in the indicator set developed by the Federal States Initiative on Core Indicators (LIKI, Länderinitiative Kernindikatoren).

Indicator ►

The 'Organic farming' indicator reports the area of organically farmed land belonging to agricultural holdings subject to the control system under the EU legislation on organic farming (Regulation (EC) No 834/2007 and the associated implementing rules), as a percentage of the total agricultural land area. It includes both land fully converted to organic farming and land still in the process of conversion.

The decision to convert to organic farming lies with individual farms. The German federal government plans to structure the conditions for conversion in such a way that organically farmed land area can increase to 20% of the total agricultural land area in coming years.

Composition ►

The data are based on agricultural structure surveys published regularly by the German Federal Statistical Office. Land is considered to be organically farmed if an agricultural holding produces plant or animal commodity 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.

272,139 ha of land was under organic cultivation in 1994. This represented 1.6% of the total agricultural land area and related to only 5,866 farms. The figures have risen continuously since monitoring began. At the end of 2009, 21,047 farms cultivated 947,115 ha of land in accordance with the EU legislation on organic farming. This corresponds to 5.7% of farms and 5.6% of the total agricultural land area.

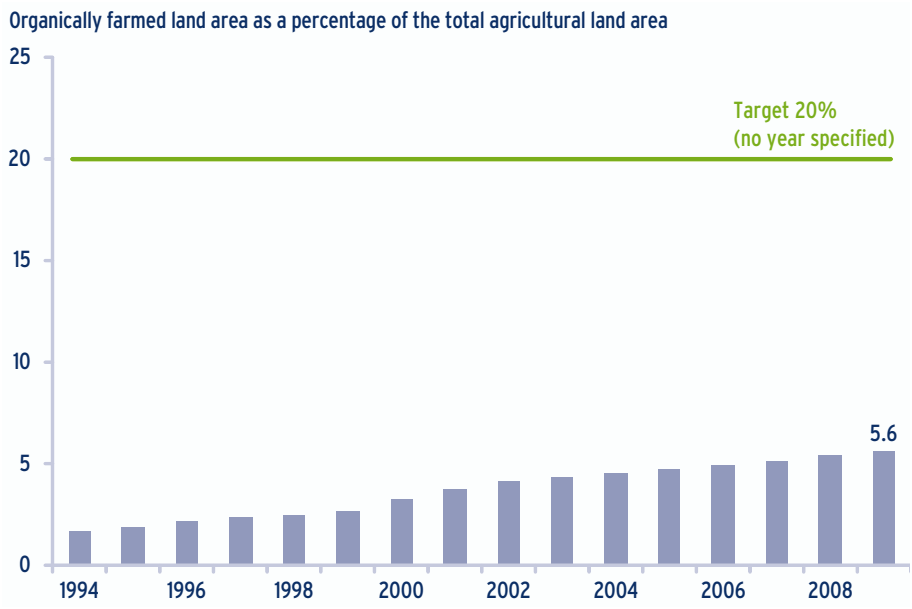
The growth in organic farming must be interpreted as a response to sustained strong demand and increased prices for organic products. The policy framework provided by the German federal government and the federal states also plays an important part – most notably the fact that almost all federal states have resumed the payment of subsidies for conversion to organic farming. Most agricultural holdings with organic production have also done well commercially in recent years.

Despite the ongoing positive trend and the favourable projections for organic farming, the current indicator value is still very far away from the target. According to Eurostat statistics for 2007, on a European (EU-15) comparison, Germany is slightly above the average (4.7%) in terms of the percentage of agricultural land organically farmed, but lags behind e.g. Austria (11.7%), Sweden (9.9%) and Italy (9.0%).

◄ Assessment

The German federal government aims "to retain appropriate support for organic farming" (BMU 2007: 48). It is planned to structure the conditions for conversion to organic farming in such a way that organically farmed land area can increase to 20% of the total agricultural land area in coming years.

Organic farming



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% of the total agricultural land area

Core assessment
The proportion of organically farmed land area is continuously increasing (5.6% in 2009), but is still very far from the 20% target. It is planned to structure the conditions for conversion to organic farming in such a way that organically farmed land area can increase to 20% of the total agricultural land area in coming years.

High nature value farmland

Richly structured high nature value farmland in Little Switzerland in Upper Franconia

Farmland biodiversity has decreased significantly in the last 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.

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 federal states. The purpose of the indicator is to help assessing impacts of farming on biodiversity and progress in promoting biodiversity in agricultural landscapes. To obtain the data needed for the indicator, farmland has been mapped, since 2009, using a standardised survey and assessment method in a newly developed nationwide monitoring programme based on statistical sampling. The area figures obtained for sample plots are extrapolated to the total area of farmland in Germany. The area of high nature value farmland (in ha) is determined and assigned to different value classes at regular intervals. The method will be evaluated in light of experience and the indicator will be refined as appropriate.

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 high nature value farmland is targeted to increase by at least ten percentage points from 2005 to 2015. As monitoring did not start until 2009, the 2009 figure is taken as the starting value. If the area share of HNV farmland is to increase by at least ten percentage points in ten years starting from 2009 (and if the trend is assumed to remain linear until 2019), then the target corresponds to an increase of at least six percentage points, i.e. to an area share of at least 19% of the total farmland area, until 2015.

Council Regulation (EC) No 1698/2005 of 20 September 2005 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 1974/2006.

◄ Composition

HNV farmland is monitored nationwide in a representative sample of some 900 plots each covering a one kilometre square. The same plots are used for the monitoring of breeding birds, providing data among other things for the 'Species diversity and landscape quality' indicator. The 'HNV farmland' indicator value is to be updated for reporting purposes every two years from 2010. The area of high nature value farmland and of each of the three value classes is extrapolated for the whole of Germany from the sample and expressed as a percentage of the total farmland area. The latter is determined from the Official Topographic and Cartographic Information System (ATKIS, Amtliches Topographisch-Kartographisches Informationssystem).

◄ Assessment

The 2009 survey returns an indicator value of 13.0% for the proportion of HNV farmland area relative to the total farmland area. 2.2% of farmland was classified as farmland of exceptionally high nature value and 4.5% as farmland of very high nature value. As land in these two value classes is vital to the conservation of biodiversity in agricultural landscapes, action must be taken in future particularly to maintain such land and augment its area by better rewarding the efforts of farmers. 6.3% of all farmland – just under half of the entire HNV farmland area – was classified as farmland of moderately high nature value. This land meets the requirements for classification in the lowest category of HNV farmland as it has greater species diversity and is structurally richer than non-HNV farmland but does not meet the criteria for land in the exceptionally high and very high nature value categories.

Species-rich grassland

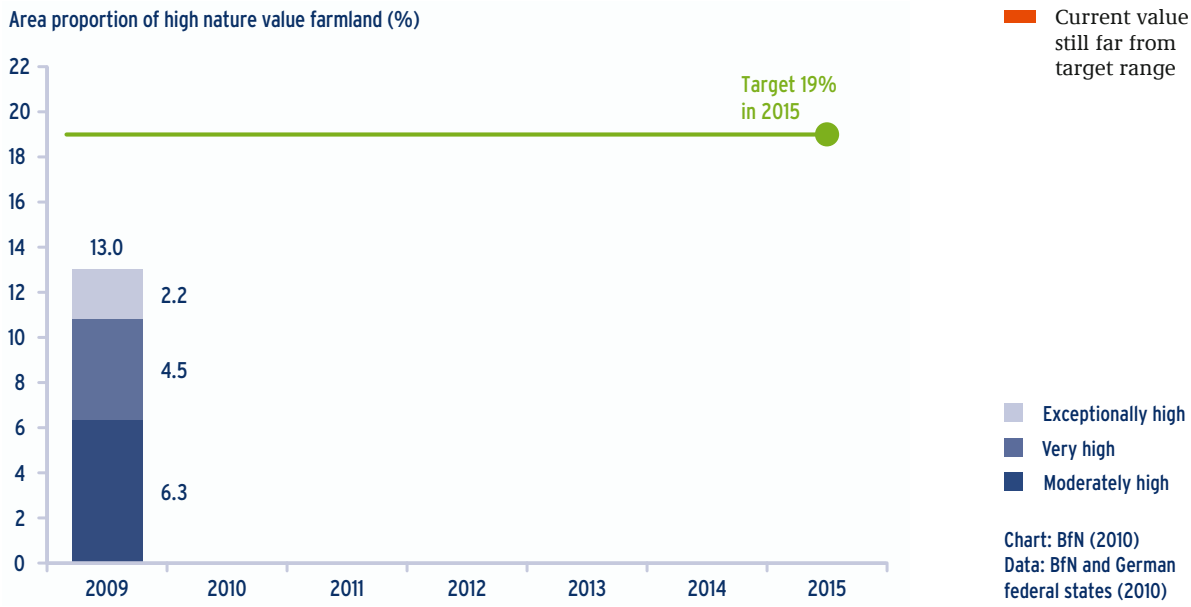
"By 2015, the proportion of land used for valuable conservationist agro-biotopes (high-grade grassland, orchard meadows) has increased by at least 10% compared with 2005. In 2010, semi-natural landscape elements (such as hedges, borders, field shrubbery and small bodies of water) account for at least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

Increasing the area proportion of HNV farmland to 19% by 2015 requires further substantial targeted efforts. Alongside other steps, agri-environmental measures may contribute here by rewarding environmentally sound farming practices that sustain nature. Measures taken should include:

- Avoidance of further ploughing up of grassland
- Establishment of extensively farmed or unused buffer strips around landscape elements and arable land
- Keeping fields with low-fertility soils fallow under targeted fallow land management
- Increased use of contract-based nature conservation to safeguard species-rich habitats in the open countryside shaped by farming
- 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
- Reduction of farming intensity on suitable grassland

Farmers should be compensated for any financial losses on implementation of these measures in order to maintain farm competitiveness.

High nature value farmland



Thematic areas
B 2.4 Agriculture
C 6 Agriculture and silviculture

Definition
Area proportion of high nature value farmland as a percentage of the total farmland area

Target
The objective is to increase the area proportion of high nature value farmland to 19% of the total farmland area by 2015.

Core assessment
In 2009, exceptionally high, very high and moderately high nature value farmland area accounted for 2.2%, 4.5% and 6.3% of the total farmland area respectively (adding up to a 13.0% 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.

Genetic diversity in agriculture

Merino sheep

The indicator reports threats to genetic resources in agriculture using the example of selected indigenous farm animal breeds.

Modern animal and plant breeding focuses on a small number of high-yielding animal breeds and plant varieties to meet modern market needs. As a result, the genetic diversity of animal and plant resources in use is rapidly declining. In Germany, as elsewhere, traditional crop varieties (landraces and local varieties) account for a decreasing share of farmed crops. Similarly, indigenous, in many cases regionally characteristic breeds of farm animals are becoming displaced by a small number of breeds selected for high yields and global use. The current Red List of Germany's Endangered Indigenous Farm Animal Breeds classifies 54 of the 65 indigenous breeds of horse, cattle, pig, sheep and goat as endangered or subject to monitoring. The loss of this plant and animal genetic diversity represents an impoverishment of historically evolved cultural landscapes and a loss of valuable genetic potential for breeding purposes. The National Strategy on Biological Diversity therefore includes a goal of conservation and sustainable use of regionally characteristic genetic diversity of animal breeds and crop plant varieties.

In response to the situation with farm animal breeds, the German federal government, the federal states and other stakeholders established the National Programme for Conservation and Sustainable Use of Animal Genetic Resources in Germany, which was adopted by the Conference of Agricultural Ministers in 2003 (revised: BMELV 2008). The programme provides guidance for a coordinated approach by all involved. It includes measures relating to cattle, pigs, sheep, goats, horses, rabbits and poultry.

◄ Indicator

The 'Genetic diversity in agriculture' indicator assesses threats to genetic resources in agriculture. It is compiled by aggregating endangerment data for the five most important farm animal species (horse, cattle, pig, sheep and goat). The underlying data consist of the classification of breeds into Red List categories in the Red List of Germany's Endangered Indigenous Farm Animal Breeds. For this purpose, the National Programme for Conservation and Sustainable Use of Animal Genetic Resources in Germany specifies four Red List categories comprising a graded scale of endangerment levels.

In the National Strategy on Biological Diversity, the German 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.

"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 indicator is a nationally modified form of the 'Livestock Genetic Diversity' indicator of the common European SEBI 2010 indicator set. The underlying data consist of population statistics on each farm animal breed. These statistics are provided by breeder and herd book organisations and collated by the Information and Coordination Centre for Biological Diversity (IBV, Informations- und Koordinationszentrum Biologische Vielfalt) at the Federal Office for Agriculture and Food (BLE, Bundesanstalt für Landwirtschaft und Ernährung) in the Central Documentation of Animal Genetic Resources in Germany (TGRDEU, Zentrale Dokumentation Tiergenetischer Ressourcen in Deutschland). The indicator is compiled from the classifications of breeds into categories of the Red List of Germany's Endangered Indigenous Farm Animal Breeds (BLE 2010).

Murnau-Werdenfels cow

A breed is defined as indigenous under Par. 3 Sect. 4 of the German Animal Breeding Act (Tierzuchtgesetz) if in respect of herds kept in Germany the original herd book was established in Germany and has been maintained there ever since, or for herd books established longer ago, the herd book has been maintained in Germany since 1949. The competent authority can further acknowledge a breed as indigenous if the original herd book was not established in Germany but (a) the only herd book for the breed is yet maintained in Germany and a breeding programme is carried out there or (b) in respect of herds kept in Germany a herd book has been maintained and a separate breeding programme has been carried out in Germany since at least 1949.

A breed's endangerment is measured by the effective population size (N_e) that reflects the loss of genetic diversity (per generation) within a given population. The value of N_e can be determined by a number of methods, which can differ substantially according to the situation of each breed. The final classification into endangerment categories is currently performed by the Advisory Board for Animal Genetic Resources at the Federal Ministry of Food, Agriculture and Consumer Protection (BMELV, Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz). There are four Red List categories: (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 and (4) non-endangered breeds (NE).

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. The indicator is to be regularly updated.

Assessment ►

The indicator shows the percentage of endangered indigenous horse, cattle, pig, sheep and goat breeds to be very high, at over 83% in 2010. It is nonetheless positive news that no indigenous large animal breed died out in Germany in the period under review. The slight increase in the endangerment figure between 2006 and 2010 relates to the identification of two new indigenous breeds that are classified as endangered. Within the endangerment categories, a slight shift can be observed towards a lesser level of endangerment. As a result of conservation programmes in the last ten years, the share of breeds in the Phenotypic Conservation Population category has fallen by some four percentage points.

The need for action varies considerably between the different farm animal species. With cattle, for example, the market potential of products from indigenous breeds already plays an important part. In sheep farming, on the other hand, the marketing of breed-specific products with the intention to effectively secure the survival of individual breeds still faces major problems. The persistently large share of endangered sheep breeds also reflects a sharp decline in the number of sheep farmers and in the total sheep population in Germany. The challenge therefore continues to be ensuring sustainable use and long-term conservation of indigenous breeds on a species-specific basis.

The situation in animal breeding can only be applied to other agricultural genetic resource sectors to a very limited extent. Work is therefore underway to develop further specific indicators, first and foremost to track the situation in plant breeding, in order to provide a more comprehensive picture of agricultural genetic diversity in future years.

Genetic diversity in agriculture

Proportion of endangered indigenous horse, cattle, pig, sheep and goat breeds (%)

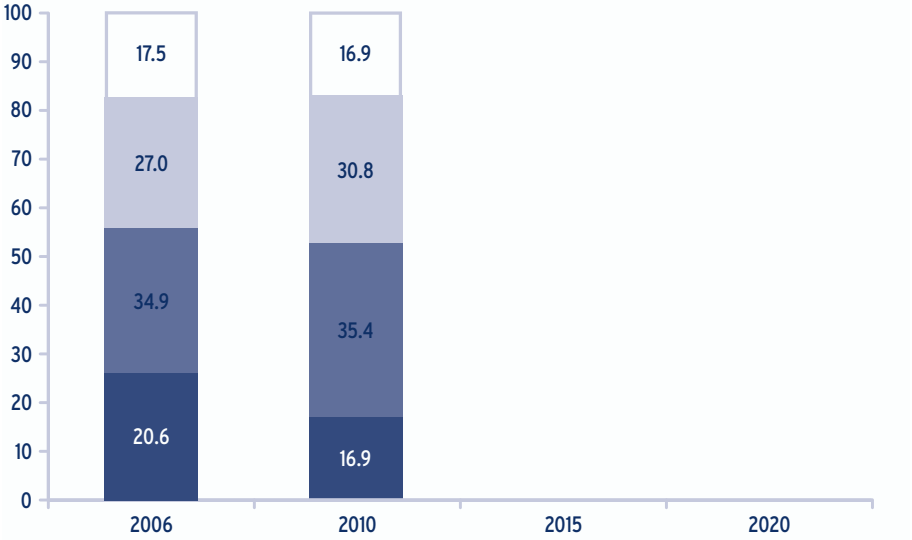


Chart: BfN (2010)
Data: BLE (2010)

Thematic areas
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 level of endangerment to genetic resources in agriculture using the example of the five most important farm animal species (horse, cattle, pig, sheep and goat).

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

Core assessment
The proportion of endangered indigenous breeds (MP, CP and PCP) is very high at slightly over 83% in 2010. Specific action must be taken to reduce the threat situation.

Genetic engineering in agriculture

Genetically modified maize (*Zea mays*) was cultivated in Germany until 2008.

The environmental implications of cultivating genetically modified plants (GMPs) are complex and controversial. Genetic engineering makes it possible to modify genes, to transfer genes from one organism to another largely independently of natural species barriers, and to use genetic modification to introduce new traits. GMPs interact with wild plants and animals where they are cultivated and in the surroundings of the fields. Risks can emerge, even where GMPs are approved, due to unforeseen consequences of new GMP traits and complex interactions with other organisms in the open landscape.

Indicator ►

The indicator provides information about the extent of potential interactions between the use of genetic engineering in agriculture and biodiversity.

The indicator reports the size of all officially registered areas under cultivation with GMPs. It provides information to help evaluate the extent and significance of developments in the use of genetic engineering in agriculture. In this way, the indicator fulfils a key role in the 'Biosafety and preventing the adulteration of fauna and flora' action area under the National Strategy on Biological Diversity.

In the National Strategy on Biological Diversity, the German federal government sets various objectives relating to genetically modified organisms (GMOs): It is necessary to continue ensuring that the release and use of GMOs is unlikely to pose any threat to wild species. GMOs must pose no threat to biodiversity also in the future, particularly in protected areas. Beyond these general qualitative goals, it is currently not possible to assign specific quantitative targets or maximum levels to the indicator. This is because scientific findings about the impacts of GMP cultivation on biodiversity partly leave gaps and are in some cases contested so that they do not yet provide a sound foundation for setting such standards.

Composition ►

"In future, genetically modified organisms will continue to pose no threat to biological diversity, particularly in protected areas." (BMU 2007: 47)

The underlying data for the indicator are provided by the German GMO Location Register, which is kept by the Federal Office of Consumer Protection and Food Safety (BVL, Bundesamt für Verbraucherschutz und Lebensmittelsicherheit) and is available online. Every year, farmers who plan to cultivate GMPs must notify BVL of the land parcel, the organism (e.g. maize) and the unique identifier (e.g. MON-00810-6) for each cultivation site.

The indicator is the total area of all GMP cultivation sites reported to BVL according to the GMO Location Register. In compiling the indicator, the area under cultivation is totalled separately for each GM crop species (maize alone up to 2009). The total area under cultivation with GMPs is reported annually in hectares.

The indicator has been compiled for the notified GMP cultivation sites for each year, since the GMO Location Register was initiated (2005-2009), and relates to Bt maize MON 810, the sole genetically modified crop approved for commercial cultivation during this period. In Germany, this Bt maize variety was cultivated on a very small area between 2005 and 2009. The number of locations and the total area under cultivation increased continuously at a low level from 2005 to 2008. In 2006 and 2007, the area under cultivation with GMPs nearly tripled year on year. The rate of increase then dropped sharply in 2008. The area under cultivation with GMPs reached its largest extent so far in 2008, when it amounted to 3,180 ha divided among 201 locations (0.15 percent of the total area under cultivation with maize of just under 2.1 million ha). Cultivation was concentrated in the east of Germany (Mecklenburg-Western Pomerania, Brandenburg, Saxony-Anhalt, and Saxony). Approval for Bt maize has been suspended in Germany since 2009 under Article 23 of the European Deliberate Release Directive. This resulted in the area under cultivation dropping to zero hectares.

◄ Assessment

"We aspire to the following: ... In future, to continue to ensure that the release and use of genetically modified organisms is unlikely to pose any threat to wild species." (BMU 2007: 28)

Genetic engineering in agriculture

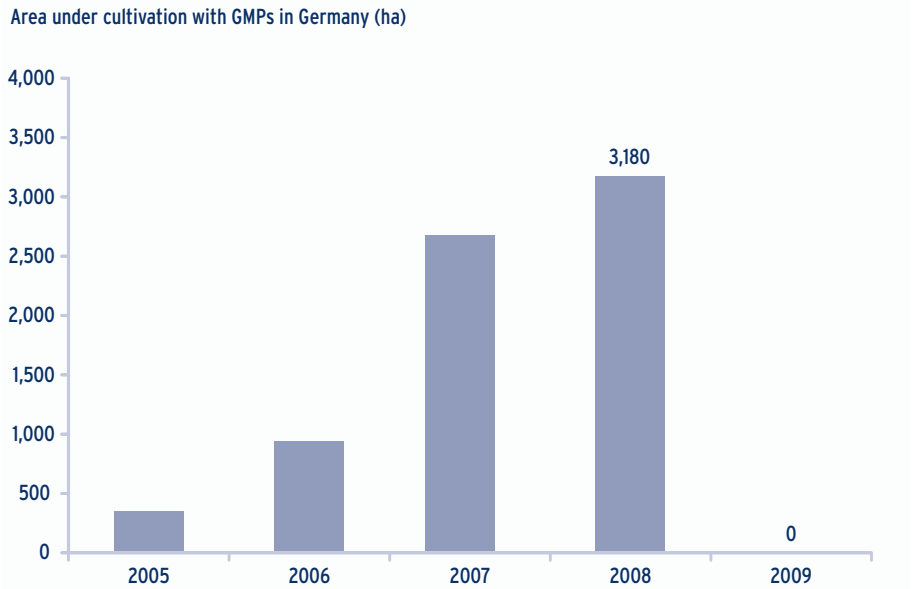


Chart: BfN (2010)
Data: BVL (2009)

Thematic areas
C 3 Biosafety and preventing the adulteration of fauna and flora

Definition
Total area notified under cultivation with GMPs

Qualitative target
GMOs should continue to pose no threat to biological diversity, particularly in protected areas. Specific quantitative targets or maximum levels for the indicator cannot currently be assigned.

Core assessment
After ongoing growth from 2005 to 2008, the area under cultivation with GMPs fell back to zero in 2009 following suspension of approval for the MON 810 Bt maize variety.

Agricultural nitrogen surplus

Spreading liquid manure on nutrient-rich grassland

Nitrogen compounds are used in agriculture to fertilise crops. By well-targeted fertiliser application and purposeful crop rotation, farmers aim to replace nutrients taken out of the soil during cultivation in order to ensure yields, the quality of products and soil fertility for the long term. Nitrogen compounds that are not taken up by crops (except for any quantities that are retained in farmland soils) adversely affect groundwater, inland surface waters, marine and terrestrial ecosystems, and also result in emissions of greenhouse gases and acidifying air pollutants. Mineral fertilisation for crop production is not the only source of nitrogen compounds on farmland. While mineral fertilisers account for 62% of the total, animal production contributes another 33% and a further 5% comes via the atmospheric pathway, for example from transportation, industry and housing.

The indicator provides information on the development of agricultural nitrogen surpluses.

The eutrophying and acidifying effects of nitrogen immissions exert severe pressure on biodiversity. 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. As the accumulation of nutrients in inland and coastal waters shows, however, diffuse inputs of nitrogen and other compounds are still too large, especially in regions with intensive agricultural land use and livestock farming. Particularly on arable land, overuse of fertilisers also results in excessive nitrate levels in groundwater.

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

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 under the National Sustainability Strategy and has also been reported recently in the Indicator Report 2010 under the National Sustainability Strategy (Statistisches Bundesamt 2010). 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.

Indicator ►

The indicator provides information on the development of adverse impacts on environmental media and habitats as a result of nitrogen from agriculture. Due to the level of aggregation, the indicator does not provide information on regional nitrogen surpluses as it is calculated on an overall balance basis. The indicator states the difference between nitrogen flows into and out of agriculture. The aggregate surplus is computed on basis of a 'farm gate' balance, meaning that nitrogen flows within the agricultural sector are not counted (except for domestic animal feed production). The resulting yearly nitrogen surpluses in kg/ha farmland are averages for Germany as a whole and are not farm level figures.

"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)

Agricultural production mostly takes place in open systems and over long cycles. Also, not all nitrogen compounds are equally readily available to crops as nutrients. This means that the substances introduced, including nitrogen, are not fully exploited. Certain quantities of nitrogen also remain on fields in crop residues after harvesting. With some crops, such as oilseed rape or vegetables, these quantities can be substantial, and they are included in the nitrogen surplus. Crop residues are important in maintaining the content of soil humus and hence soil fertility. Against this background, the German federal government has set a quantitative target of reducing yearly overall net nitrogen surpluses in agricultural production to 80 kg/ha of farmland by 2010. Further reductions are aimed for by 2015.

The German federal government sets the following targets in the National Strategy on Biological Diversity: "To reduce the surplus nitrogen in the overall balance sheet to 80 kg/ha by 2010, with a view to a further reduction by 2015" (BMU 2007: 48).

◄ Composition

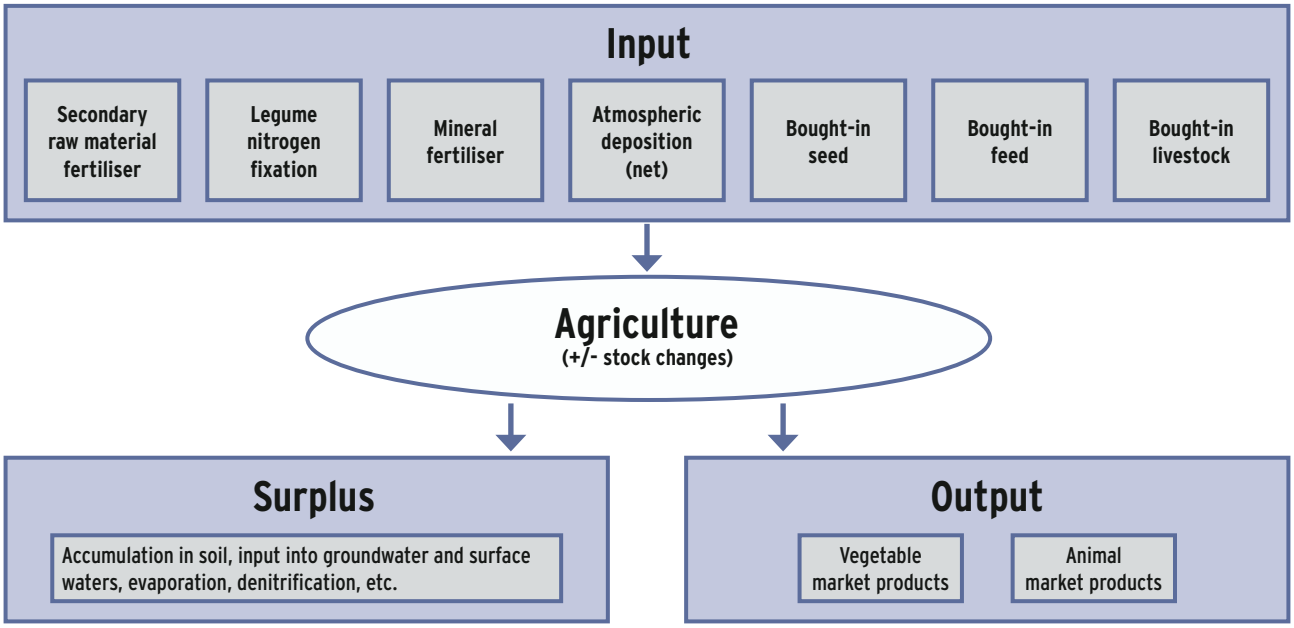
In an overall balance, the quantity of nitrogen compounds flowing each year into and out of agriculture is computed or approximately estimated on an aggregate basis (see figure below). The nitrogen inputs taken into account comprise nitrogen from fertiliser, atmospheric deposition, biological nitrogen fixation, seed and propagating material, and from domestic and imported animal feed. The output side consists solely of nitrogen from plant and animal market products.

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

The methodology for compiling the indicator has been revised at national level and the data for the entire reporting period has been recomputed on the new basis. The primary time series is a three-year rolling average relative to the middle of each set of three years. In the indicator graph, a rolling average is used to smooth non-governable factors such as annual fluctuations due to weather and market influences.

Schematic diagram of the overall nitrogen balance for agriculture

Bach & Frede (2005), modified

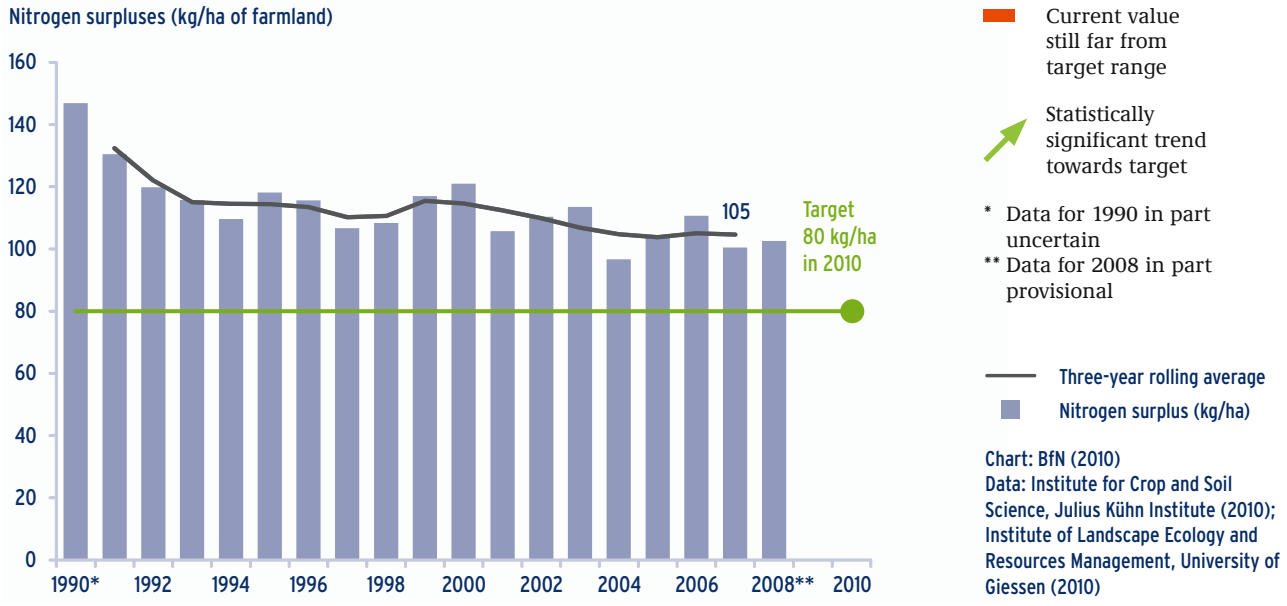


Assessment ►

From 1991 to 2007, the yearly nitrogen surplus fell from 132 kg/ha to 105 kg/ha (three-year rolling average). This represents a decrease of somewhat more than 20% from the 1991 level. The current level nonetheless remains well above the target of 80 kg/ha per year.

The sharp decrease in nitrogen surpluses early in the time series relates to reductions of livestock in eastern Germany. The minor ongoing decrease in the time series since 1993 relates to efficiency gains in nitrogen use (increased yields in plant production and increased feed conversion in farm animals). While nitrogen inputs fell only slightly between 1991 and 2007 (to 193 kg/ha per year, a decrease of 4.5%), nitrogen outputs increased compared with 1991 by 27% (to 88 kg/ha per year). Analysis of farm data shows that large surpluses primarily arise on farms with large livestock holdings. Nitrogen surpluses are also shown to vary considerably in size, however, even among livestock farms of similar operational structure. This implies that there is further scope for reductions and efficiency gains in nitrogen use, for example by improving farm nutrient management, adapting farming practices to local conditions, choosing suitable crop varieties, and matching livestock density to the capacity of available farmland to take up the organic fertiliser produced, in line with good farming practice.

Agricultural nitrogen surplus



Thematic areas
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 basis of a 'farm gate' balance)

Target
Yearly overall net nitrogen surpluses are to be reduced to 80 kg/ha of farmland by 2010. Further reductions are aimed for by 2015.

Core assessment
From 1991 to 2007, the yearly nitrogen surplus fell from 132 kg/ha to 105 kg/ha (three-year rolling average). The current value is far above the target of 80 kg/ha per year.

Exceedance of critical loads for nitrogen

Nitrogen compounds enter the atmosphere from various sources including industry, transport, housing and farming. Such compounds are transported over long distances as gases or microscopically small particles (aerosols). They return to ground by gravity, collision, precipitation or condensation. Accumulation of nitrogen compounds (eutrophication) notably harms habitats that are naturally nutrient-poor, along with the plants and animals occurring in such places. As a result, plants adapted to low-nutrient sites are outcompeted by nitrophilous species. This also indirectly affects many animal species that depend on specific plant species. 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.

Industrial nitrogen emissions enter the atmosphere and accumulate in ecosystems.

Ecosystem-specific load limits for atmospheric inputs of harmful substances and nutrients are known internationally as critical loads (CLs). According to present 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 CLs. As substances are transported in the atmosphere across long distances and national borders, there are various international agreements with the aim of reducing specific types of emissions. Both the EU National Emission Ceilings (NEC) Directive and the Gothenburg protocol to the Convention on Long-range Transboundary Air Pollution (CLRTAP) specify national emission ceilings for ammonia and nitrogen oxides to be achieved by 2010.

The indicator provides information on the impairment of biodiversity due to exceedance of critical loads for eutrophying nitrogen inputs.

"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)

The indicator reports the proportion of the assessed area of sensitive ecosystems in which ecosystem-specific critical loads of nutrient nitrogen are not exceeded. In accordance with the objectives of the National Strategy on Biological Diversity, the target is no exceedance of critical loads in sensitive ecosystems nationwide by 2020. This is because avoiding any exceedance of these critical loads, according to present knowledge, prevents both acute and long-term harm to affected sensitive ecosystems.

◄ Indicator

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

Composition ►

Ecosystem-specific critical loads are a quantitative estimate of the deposition rate of a substance per unit area and time in a specific ecosystem, below which, on current knowledge, harmful effects do not occur in the long term. Therefore, 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 re-exit the system at tolerable amounts. Quantities of nutrient nitrogen compounds entering and leaving the system must hence be brought into equilibrium. Temporary deviations from the equilibrium state are tolerable provided that the system remains capable of self-regeneration.

Loads of eutrophying nitrogen are expected to increase worldwide in the future (MEA 2005: 8 ff).

Ecosystems sensitive to nutrient nitrogen loads include the following land-use types: low-nutrient meadows and pastures, deciduous, coniferous and mixed forest, groundwater-fed 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. The following data are used to model exceedance of critical loads for nitrogen:

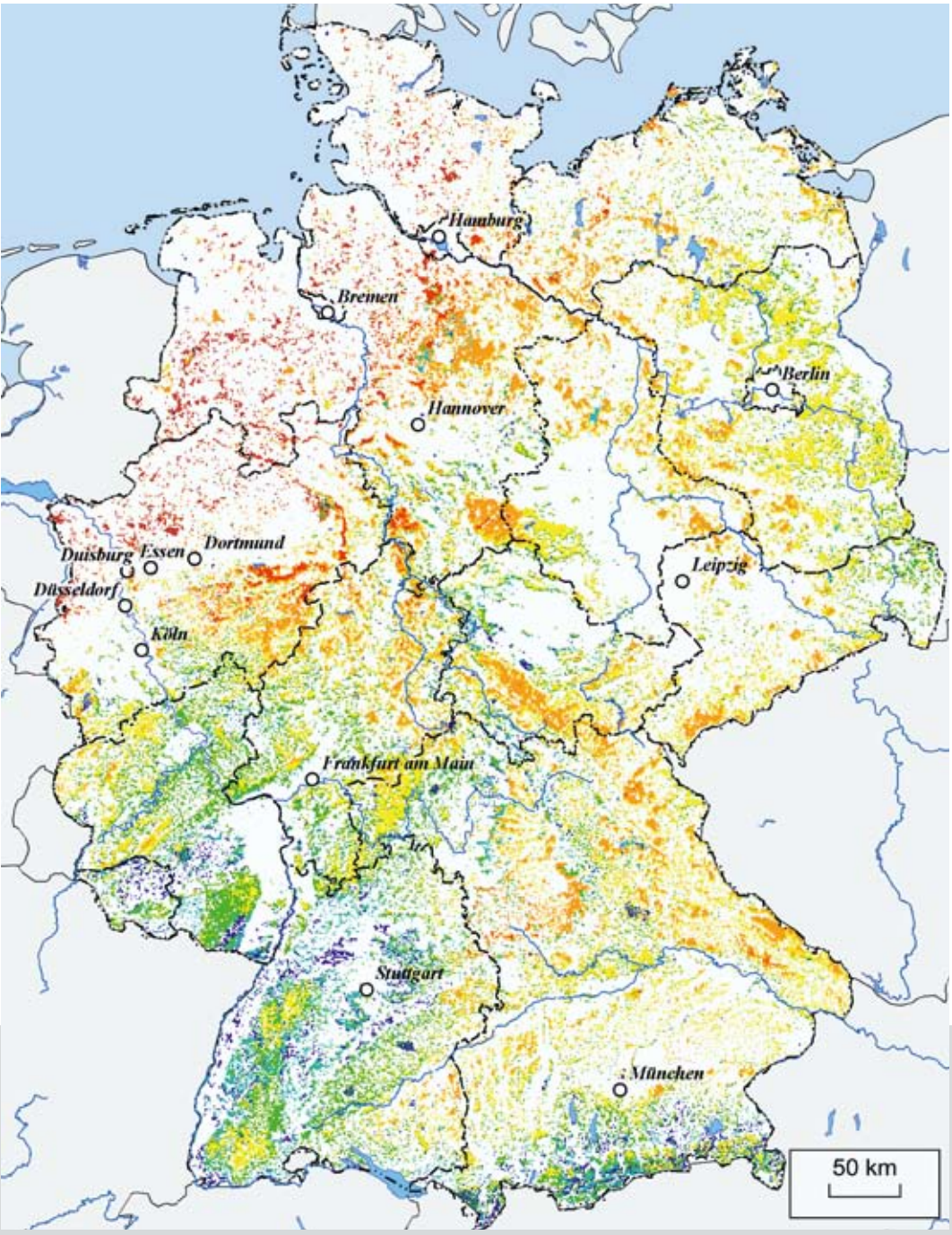
- Overview soil map of Germany (BÜK, Bodenübersichtskarte Deutschlands 1000) and forest overview soil map (Wald-BÜK)
- Map of the mean annual water percolation rate from the soil
- Land cover map (Corine Land Cover 2000)
- Climate data for Germany

Assessment ►

In 2004, critical loads for nutrient nitrogen were not exceeded in only slightly over 4% of the assessed area of sensitive ecosystems. The figure improved significantly, however, in comparison to 1990 when critical loads were not exceeded solely in 0.02% of the assessed area. The proportion of area with small exceedances (by less than 10 kg N per ha per year) decreased from 22.0% to 7.8% between 2000 and 2004. The proportion of area with very high exceedances (by more than 30 kg N per ha per year) increased sharply from 10.4% to 22.7% during the same period. The adjacent figure shows the distribution of the exceedances across Germany in 2004.

The National Strategy on Biological Diversity determines the following target for nationwide atmospheric immissions: "By the year 2020, the critical loads and levels for acidification, heavy metal and nutrient discharges (eutrophication) and for ozone will be met, so that even sensitive ecosystems will enjoy lasting protection." (BMU 2007: 54)

Exhaust fumes from road traffic are another source of atmospheric nitrogen compounds.



Exceedance of critical loads for nutrient nitrogen in 2004

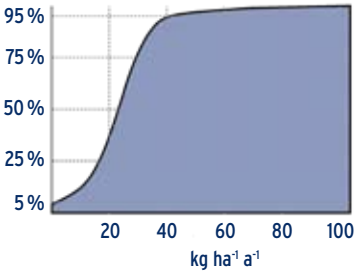
kg ha^{-1} a^{-1}

- None
- 0 - 10
- 10 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- >50

Proportion

- 4.27 %
- 7.84 %
- 24.94 %
- 40.21 %
- 17.19 %
- 2.52 %
- 3.02 %

Distribution



Exceedance of critical loads for nutrient nitrogen in 2004

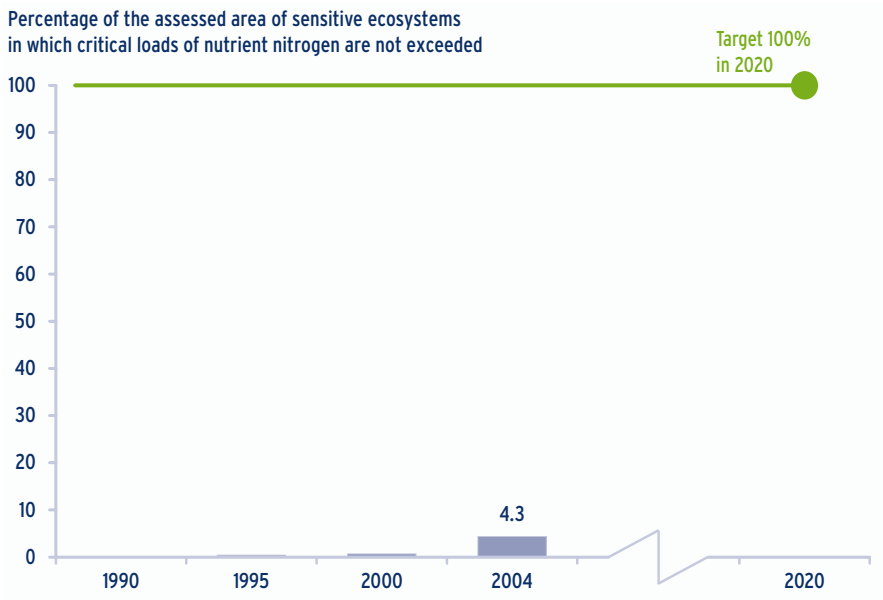
Federal Institute for Geosciences and Natural Resources (BGR, Hannover); German Meteorological Service (DWD, Offenbach); Federal Environment Agency (UBA, Berlin); ÖKO-DATA, Stausberg

Exceedance of critical loads as a result of long-term and current inputs of nitrogen compounds indicates the probability of harm to the affected sensitive ecosystems. The colour coding in the map shows the degree to which critical loads are exceeded in certain areas according to the model. The depicted probability does not mean that biological effects are visible or adverse impacts are actually detected in the year concerned. This is partly because adverse effects can take a considerable time lag to appear.

While nitrogen inputs from transport and industry decreased from 1990 to 2004, there is so far no downward trend in ammonia emissions and the resulting nitrogen inputs from farming. National and international clean air measures have delivered only minor improvements in eutrophication compared with the successes in terms of acidification. Meeting the target of not exceeding critical loads by 2020 will take considerable effort. In particular, ammonia emissions must be further reduced in farming. This can be achieved by various means, including adapted feeding strategies with less nitrogen, proper manure storage, low-emission application and immediate working of manure into the soil.

The Federal Environment Agency has commissioned a recalculation of the already compiled values and the compilation of values for subsequent years. This work includes updating critical loads under the Convention on Long-range Transboundary Air Pollution (CLRTAP) of the United Nations Economic Commission for Europe (UNECE) and high-resolution deposition data in accordance with the current state of international knowledge. The results are expected in 2010 yet.

Exceedance of critical loads for nitrogen



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

Definition
Percentage of the assessed area of sensitive ecosystems in which ecosystem-specific critical loads of nutrient nitrogen are not exceeded

Target
Critical loads not exceeded in sensitive ecosystems nationwide by 2020

Core assessment
Critical loads were not exceeded only in 4.3% of the assessed area of sensitive ecosystems in 2004. While atmospheric nitrogen inputs from transport and industry decreased from 1990 to 2004, there is so far no downward trend in ammonia emissions and the resulting nitrogen inputs from farming.

Sustainable forestry

Firewood

Nearly a third of the German land area is covered with forest. Forests are home to a great diversity of species and habitats. However, numerous forest animal and plant species are endangered, critically endangered or have already gone extinct. On most forest land, the structure and function of forests in the landscape and the presence and abundance of animal and plant species are shaped by forestry. Spruce (28%) and pine (23%) are still the most common tree species, even though they would only make up a small percentage of natural forest vegetation. A semi-natural or almost natural tree species composition is encountered on about 35% of forest area. 73% of the total forest area is mixed deciduous and coniferous forest. About 46% of the forest area consists of single-layered stands, about 45% of two-layered stands and about 9% of multi-layered stands. Features of near-natural forest include – according to the type of forest and the individual site – indigenous tree species that are adapted to site-specific conditions, a pronounced vertical structure consisting of different vegetation layers, an adequate proportion of mature trees and dead wood, and numerous small-scale structures offering habitats for specialised species.

The indicator provides information on the conservation of biodiversity by sustainable forestry.

Conserving and promoting forest biodiversity requires greater emphasis to be placed on environmentally sound forms of forestry sustaining nature. The forestry sector itself recognises the benefits of nature-orientated forest management and is working purposefully at its implementation. Forest management certification can be an effective instrument for 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 German 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)

- 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 2nd Ministerial Conference on the Protection of Forests in Europe held in Helsinki in 1993. With 69%, it accounts currently for the largest proportionof 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 including WWF, Greenpeace and the German Nature and Biodiversity Conservation Union (NABU, Naturschutzbund Deutschland), social welfare associations including the German construction and metal-working unions and many private-sector business enterprises. Approximately 4% of the forest area is managed according to FSC standards.
- **Naturland** certification was developed in 1996 by Greenpeace, Friends of the Earth Germany (BUND, Bund für Umwelt und Naturschutz Deutschland), WWF and Robin Wood. The certification is based on the Naturland Standards for Organic Forest Management. Marketing and the award of the Naturland trade mark are organised under FSC group certification. Naturland-certified forest area (approximately 0.5% of the total forest area) is included in the following in FSC figures.

"Ancient woodland, which is particularly valuable from an ecological viewpoint (containing trees more than 180 years old), is now very rare, accounting for just 2% or so of forest area." (BMU 2007: 32)

Indicator ►

The indicator reports the forest area certified under the currently established certification systems (PEFC and FSC) as a percentage of the total German forest area. The German federal government has set a target of 80% 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. The exact amount of overlap is currently not known. Because of this, area figures for the two certification systems are shown as adjacent columns in the bar chart. The reference figure for computing the percentages is the total forest area in Germany, as recently determined in the Second National Forest Inventory (BWI², Zweite Bundeswaldinventur). This total figure is approximately 11.1 million ha.

Assessment ►

In 2009, 69% of the total forest area was PEFC-certified and 4% was FSC-certified. As the extent of area overlap between the two systems is currently not known, it is only possible to state that the total sum was between 69 and 73% in 2009, which is close to the target range. Looking at the development of certified forest area over time since 2000, a period of rapid growth at the beginning was followed by a marked slowdown from mid-decade. The percentage of forest area with FSC certification has fallen slightly since 2006. There is a statistically significant trend towards the 80% target over the entire assessed period since 2000.

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)

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).

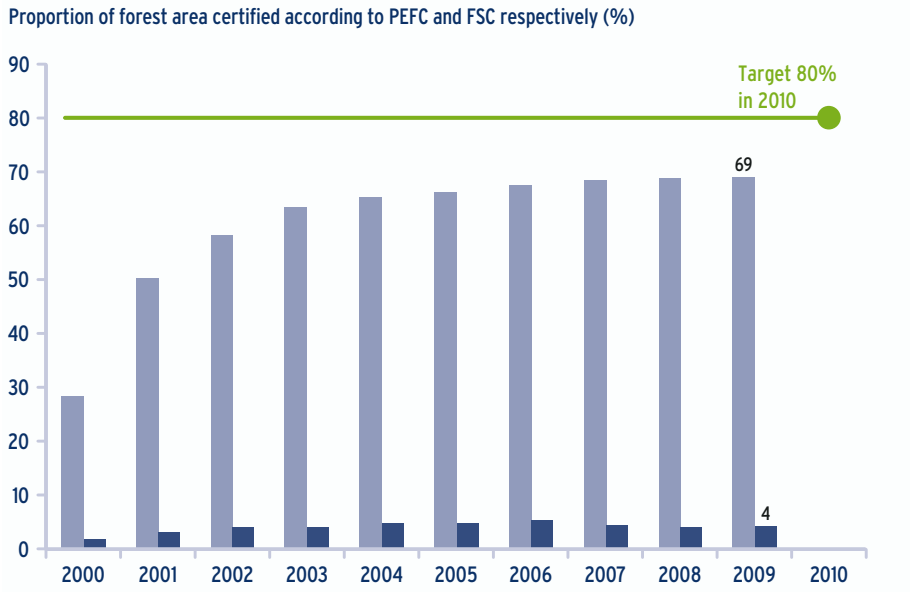
Forest certification by an independent certification organisation

In order to attain the target of the National Strategy on Biological Diversity, public forest owners in particular should be encouraged to lead by example in obtaining forest area certification according to high-quality ecological standards. A strategy also needs to be developed to increase public awareness with regard to responsible purchasing of timber and timber products and thus to raise demand for certified timber.

"By the year 2020, the conditions for typical biotic communities in forests (diversity in structure and momentum) have been further improved. The trees and bushes of the natural forest community have been completely rejuvenated, primarily via natural means. Semi-natural management forms use natural processes to strengthen the ecological functions. Old and dead wood is available in sufficient quantity and quality." (BMU 2007: 31)

"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)

Sustainable forestry



Thematic areas
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% of forest area to be certified according to high-quality ecological standards by 2010

Core assessment
In 2009, 69% of all forest area was PEFC-certified and 4% was FSC-certified. The total is close to the target range. Further certification according to high-quality ecological standards is needed to attain the 80% target.

2.4 Climate change

Climate change causes glaciers to melt and affects biodiversity.

Climate change and onset of spring

Climate change is expected to bring about changes in biodiversity throughout the world, including in Germany. Such modifications can affect the distribution and abundance of plants and animals, the composition of ecological communities, and the structure and functions of habitats. Statistical analysis has already revealed relationships between climate change and alterations in the species found in Germany.

Apple blossom

The development of many organisms is influenced less by short-run temperature changes and rather 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 long-term effects of climate change on biodiversity. It is important to note here that the detailed impacts of global warming on animals and plants and their ecological communities are complex and, so far, are only beginning to be understood. For example, certain bird species breed more successfully due to shorter winters and so benefit from climate change. With plant species and their pollinators or in predator-prey relations, on the other hand, phenological shifts can also adversely affect population trends in the species concerned.

The indicator shows the shift in the onset of phenological spring as a consequence of climate change.

The phenological monitoring programme run by the German Meteorological Service (DWD, Deutscher Wetterdienst) covers a large number of indicator plants, in some cases with time series dating as far back as 1951. There is thus a precise nationwide record of phenological shifts. Phenological data on the onset of spring are particularly useful in determining the effects of climate warming. Since spring is a time of highly variable air temperatures mostly well below the optimum for plants, any temperature rise leads to a measurable acceleration in plant development.

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).

The apple blossom marks the onset of phenological full spring and can be recorded in a reliable and standardised manner. The development of apple trees in spring serves here as a proxy for the development of many other species that respond similarly to climate changes at the onset of spring.

◄ Indicator

The ‘Climate change and onset of spring’ indicator reports the temporal shift in the beginning of apple blossom in Germany, marking the start of phenological full spring.

A restriction of atmospheric global warming to a maximum of 2 °C relative to pre-industrial temperature levels is considered to be an ambitious target regarding climate protection. This cannot be used to derive a quantitative target for the indicator presented here. However, there is a fundamental aim of counteracting any earlier arrival of phenological full spring by means of a consistent climate protection policy.

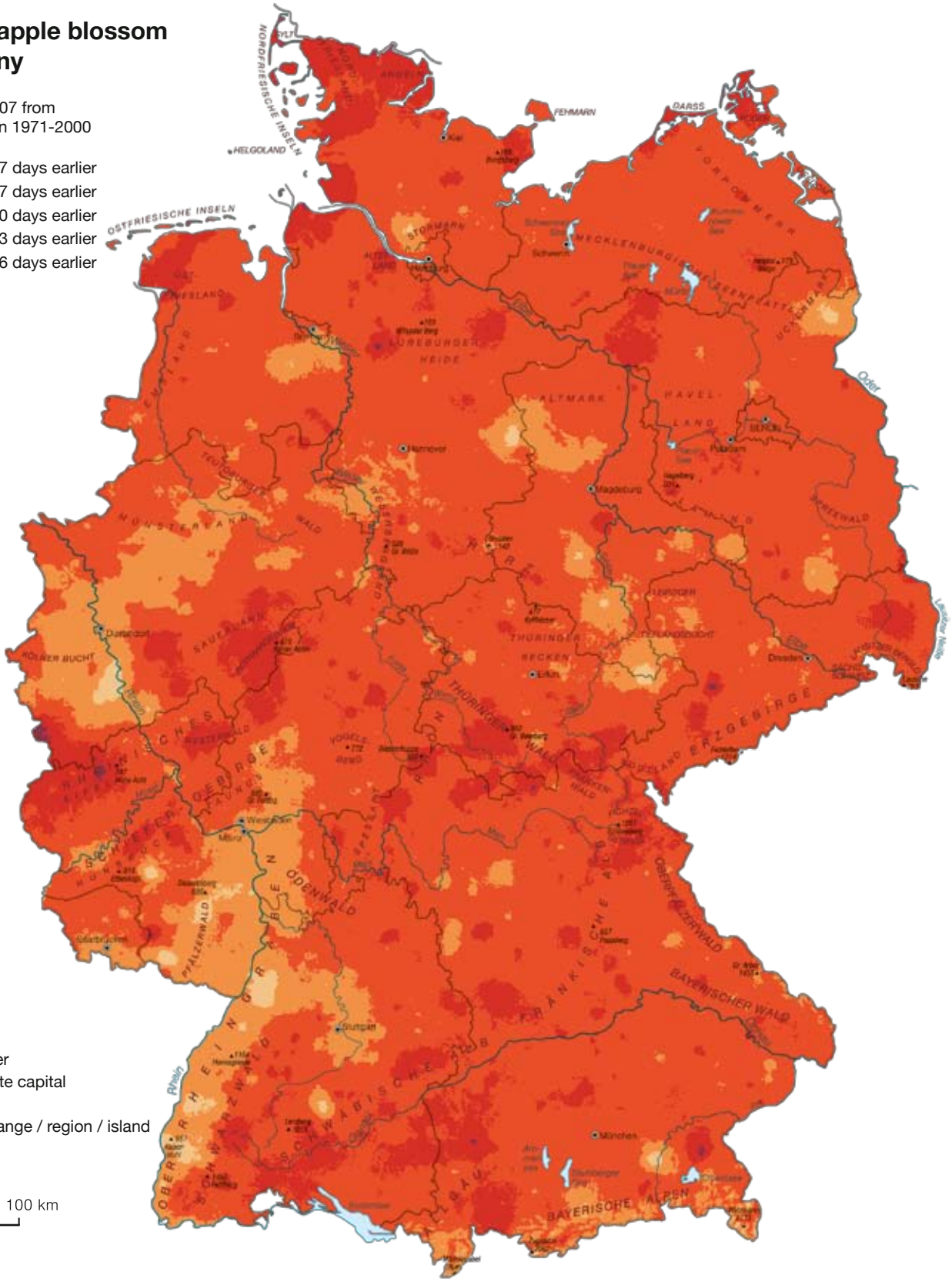
◄ Composition

The time of apple blossom is recorded at some 1,200 monitoring locations throughout Germany every year. The data are collected by the German Meteorological Service (DWD, Deutscher Wetterdienst). The day of the first appearance of apple blossom is stated as a number of calendar days since the year began. The data reported to DWD are averaged to produce an annual mean figure for Germany as a whole. A linear trend line for the entire reporting period from 1951 to 2009 and a ten-year rolling average are also shown.

Onset of apple blossom in Germany

Deviation in 2007 from long-term mean 1971-2000

- > 27 days earlier
- 21 to 27 days earlier
- 14 to 20 days earlier
- 7 to 13 days earlier
- 0 to 6 days earlier



State border
Erfurt — Federal state capital
Brocken ▲ 1142 — Altitude
HARZ — Mountain range / region / island

0 50 100 km

Authors: J. Augustin, S. Erasmi
Cartography: A. Müller
Leibniz-Institut für Länderkunde 2008

Source: *http://aktuell.nationalatlas.de*

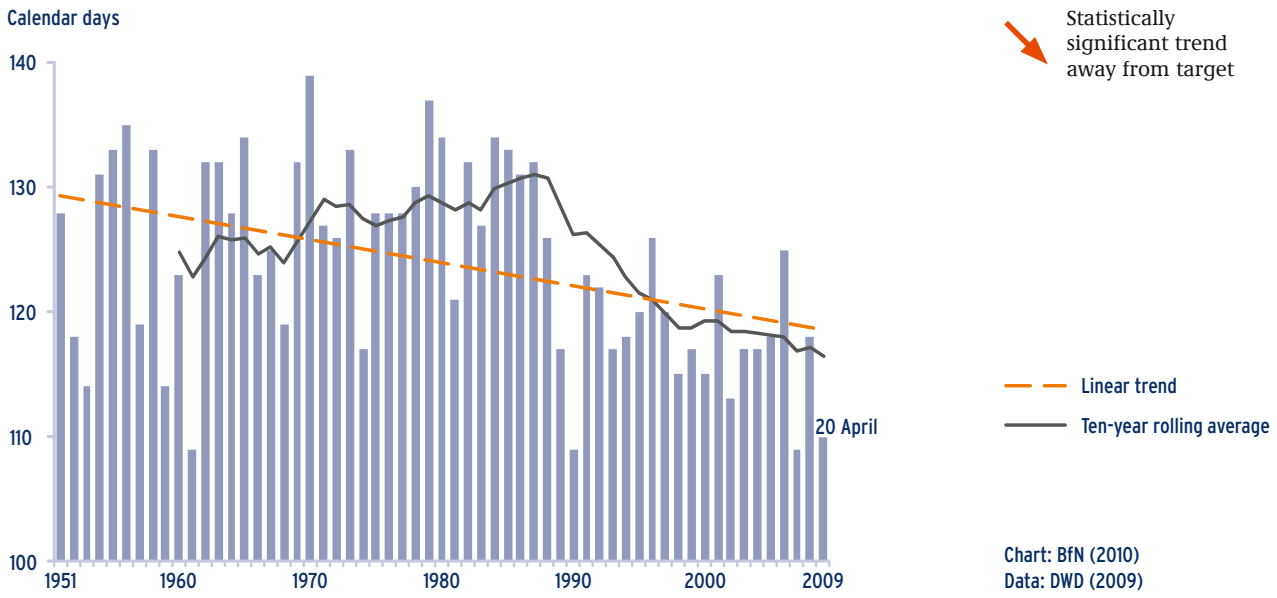
◄ Assessment

There is great variability in the date of the onset of apple blossom from year to year. The date fluctuates from 19 April (the 109th day of the year) to 19 May (the 139th day of the year). The earliest date of blossom was recorded in 1960, 1990 and 2007 and the latest in 1970. In 2007, this meant that apple blossom began in large parts of Germany over two weeks earlier and in some areas even over three weeks earlier than the long-term average for 1971 to 2000 (see adjacent map). The phenological onset of full spring in 2009 came on 20 April, only one day after the earliest beginning of blossom in the entire assessment period.

The ten-year rolling average shows a rising trend up to the end of the 1980s, indicating that the onset of spring was becoming later. This trend however reversed around 1987. A declining trend since then shows that spring arrives significantly earlier. A trend towards an earlier date of the onset of spring can also be seen for the entire 59-year monitoring period from 1951 to 2009. The onset of spring thus advanced on average by 1.66 days per decade over the last 50 years.

This trend is confirmed by other studies with various plants showing trends towards an earlier date in the year in the onset of leaf sprouting, flowering and fruit ripening. The significantly earlier onset of phenological spring mirrors the rise in measured temperatures in Germany in this season.

Climate change and onset of spring



Thematic areas
B 3.2 Climate change
C 11 Biodiversity and climate change

Definition
The 'Climate change and onset of spring' indicator reports the temporal shift in the beginning of apple blossom (the onset of phenological full spring) under the influence of climate warming.

Qualitative target
The fundamental aim is to counteract any further shift in the onset of phenological full spring towards an earlier date through climate protection measures.

Core assessment
The onset of phenological full spring has shifted significantly towards an earlier date since the late 1980s. In 2009, this was dated to 20 April, only one day after the earliest beginning of blossom in the assessment period from 1951 to 2009.

2.5 Public awareness

Biodiversity loss will only be halted if society pulls together with joint forces.

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. Everyone in Germany needs to know the importance of biodiversity as the foundation of life for current and future generations. Based on this knowledge, everyone should feel a sense of personal responsibility for the conservation of biodiversity and should act accordingly.

House Sparrow (*Passer domesticus*)

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 German 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).

The indicator assesses public awareness of biodiversity.

◄ Indicator

The indicator assesses awareness of biodiversity in the German-speaking resident population aged 18 or over and is made up of three sub-indicators: The **knowledge indicator** focuses on public awareness of the term 'biodiversity' and knowledge of its meaning. The **attitude indicator** reflects the value attached to biodiversity by survey respondents. The **motivation indicator** reports the willingness of respondents to act in various areas (for example in consumer decisions) relevant to the conservation of biodiversity.

In the National Strategy on Biological Diversity, the German federal government adopted a target that, by 2015, at least 75% of the population should rate the conservation of biological diversity among the tasks of top priority for society. The importance of biodiversity needs to be firmly rooted in public awareness and to be taken up progressively as a guide to human conduct.

"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." (BMU 2007: 60)

◄ Composition

The underlying data for the indicator are provided by representative population surveys that need to be carried out regularly. The surveys are integrated into nature awareness studies by the Federal Agency for Nature Conservation (BfN, Bundesamt für Naturschutz) or environment awareness studies by the Federal Environment Agency (UBA, Umweltbundesamt), or form part of a multiple topic survey by a social research institute. The number of respondents is at least 1,000 and where possible 2,000 to permit comparison of awareness between subgroups, for example comprising individuals with higher or lower formal education. The first comprehensive nature awareness study was conducted in 2009 (BMU & BfN 2010).

First-hand experience of nature heightens awareness of biodiversity.

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 it was before. To reach 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.
- The knowledge about the value of biodiversity needs to be better disseminated using the full range of modern communication channels that are specifically directed to various target audiences.

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 ranked sufficient or better in relation to the targets in the National Strategy on Biological Diversity to promote awareness. An **overall indicator** is then compiled, stating the percentage of survey respondents who meet the requirements in all three sub-areas, i.e. have at least sufficient awareness with regard to biodiversity. Because of this compilation method, the value of the overall indicator cannot exceed that of the lowest sub-indicator.

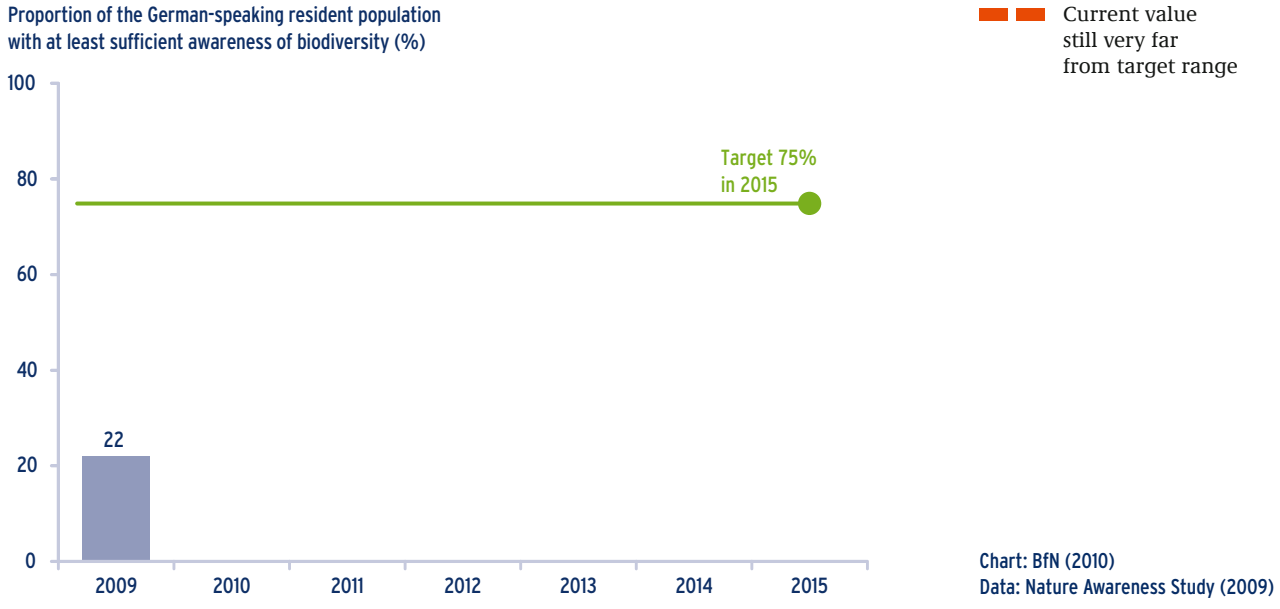
Assessment ►

In 2009, 22% of the German-speaking resident population aged 18 or over have at least sufficient knowledge and a positive attitude regarding biodiversity and at the same time display corresponding levels of motivation. The value of the overall indicator is thus still very far away from the 75% target. Comparison with earlier findings is not yet possible because the surveys were first carried out in 2009.

Looking at the sub-indicators separately reveals a varied picture. 42% of respondents know the term 'biodiversity' (knowledge indicator). Of these, most associate the term at least with species diversity and only a small number also with diversity of habitats and ecosystems or with genetic diversity. 54% of respondents have positive attitudes to biodiversity (attitude indicator) and 50% are motivated to adapt their conduct so as to promote the conservation of biodiversity (motivation indicator).

Comparing the sub-indicators, the knowledge indicator shows the lowest score, but the other two sub-indicators are likewise still far away from the defined target. Suitable measures are therefore required to promote awareness at all three levels (knowledge, attitude and motivation). Education and information programmes need to be directed to various target audiences and be specifically adapted to account for their particular requirements and interests. The National Strategy on Biological Diversity contains a large selection of public awareness, education and information measures, the systematic implementation of which is intended to help to improve awareness of biodiversity.

Awareness of biodiversity



Thematic areas
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 three sub-areas: knowledge, attitude and motivation.

Target
By 2015, at least 75% of the population rate the conservation of biodiversity among the tasks of top priority for society.

Core assessment
In 2009, 22% of the population have at least sufficient awareness of biodiversity. As the current indicator value still remains very far away from the target, greater effort is needed to communicate the importance of biodiversity addressing various audiences in a targeted manner.

3

Overall assessment

Key information on the 19 indicators under the National Strategy on Biological Diversity is brought together in a summary table in 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, 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. 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.

Quantitative targets have been set for a total of 12 indicators. The **status column** shows low target attainment (**–**) of between 50% and less than 80% for six of these indicators and very low target attainment (**––**) of less than 50% for a further five. This means that the most recently reported value in each case is far or very far from the respective target. The current value of the 'Sustainable forestry' indicator is close to the target range (**+**).

Statistical **trend analysis** is possible for a total of seven indicators. Five indicators show a statistically significant trend towards the target (↗): Protected areas, Increase in land use for settlement and transport, Organic farming, Agricultural nitrogen surplus, and Sustainable forestry. Only the indicator 'Climate change and onset of spring' shows a significantly negative trend (↘): Climate change is causing the onset of phenological full spring to advance progressively. Trend analysis for the 'Species diversity and landscape quality' indicator does not yield a statistically clear trend (~). The reported figures for this indicator have remained broadly the same over the last ten years. For twelve indicators, statistical trend analysis is not possible for methodological reasons because there are too few data points.

The targets for the 'Agricultural nitrogen surplus' and 'Sustainable forestry' indicators relate to 2010. These targets cannot be attained anymore by the end of 2010. The remaining targets for which a specific year is stated relate to 2015 or 2020. Although a number of years remain until then, the marked discrepancy between the current figures and the targets shows that target attainment will require enormous effort. Very low levels of target attainment are recorded for the ecological status of surface waters, the increase in land use for settlement and transport, the exceedance of critical loads for nitrogen, and the awareness of biodiversity. The same applies for organic farming, although no target year is specified for this indicator. The increase in land use for settlement and transport and the organic farming do, however, show statistically significant trends towards the respective targets.

The state indicators in particular underscore the fact that neither the CBD target of significantly reducing biodiversity loss nor the more ambitious EU target of completely halting biodiversity loss by 2010 can be attained in Germany by the end of 2010. The EU as a whole will likewise fall short of this target, despite considerable effort to attain it.

There is still a long way to go before biodiversity loss can be halted.

The conservation of biodiversity remains a central future challenge for Germany even beyond 2010. Significant improvements in this regard require systematic implementation of the National Strategy on Biological Diversity adopted in 2007. Work has already begun on many of the more than 400 measures in the action areas under the strategy. Because populations of animal and plant species, and habitats take a long time to regenerate, positive outcomes will only translate into the reported indicator figures with a substantial time lag. With several indicators, this effect is compounded by longer updating intervals for the underlying data.

River Elbe near Breitenhagen

Summary table

Legend: Status

++	Target attainment ≥ 90%	Current value within target range
+	Target attainment 80% to < 90%	Current value close to target range
-	Target attainment 50% to < 80%	Current value still far from target range
--	Target attainment < 50%	Current value still very far from target range

Legend: Trend

↗	Statistically significant trend towards target
~	No statistically significant trend (neither rising nor falling trend statistically significant)
↘	Statistically significant trend away from target

Legend: Indicator systems

SEBI	Streamlining European Biodiversity Indicators
NHS	National Sustainability Strategy (Nationale Nachhaltigkeitsstrategie)
KIS	Environmental Key Indicator System (Kernindikatorensystem Umwelt)
LIKI	Initiative of the German Federal States for Core Indicators on Environmental Sustainability (Länderinitiative Kernindikatoren)

Certain indicators are adopted from existing indicator systems (in some cases in modified form).

Summary table

Indicator	Variable measured or observed	Last value reported	Target	
Components of biological diversity				
Species diversity and landscape quality	Index (percentage index) of population sizes throughout Germany of 59 selected representative bird species in six primary habitat and landscape types	69% (2008)	100% in 2015	
Endangered species	Index (percentage index) based on the rankings of selected species groups in categories used in German national Red Lists	23% (2009)	16% in 2020	
Conservation status of Habitats Directive habitats and species	Index (percentage index) of assessments of conservation status of Habitats Directive Annex I habitat types and Annex II, IV and V species in the biogeographical regions of Germany	48% (2001-2006)	80% in 2020	
Invasive alien species	Number of species in the Black List of Invasive Alien Species, stated separately for the action list and the management list	6/40 species (2010)	No further increase in listed species	
Protected areas	Total size of strictly protected areas (nature conservation areas and national parks) as a percentage of the German land surface	4.1% (2008)	–	
Ecological status of surface waters	Proportion of surface water bodies – sections of rivers, streams, lakes, transitional waters and coastal waters – having good or high ecological status as a percentage of all assessed water bodies	10% (2009)	100% in 2015	
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	
Settlement and transport				
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)	94 ha (2009)	30 ha in 2020	
Landscape dissection	Proportion of undissected low-traffic areas with a minimum size of 100 km² as a percentage of the German land area, and effective mesh size (M_{eff})	25.4% (2005)	2005 level held constant	

	Status	Trend	Indicator system	Core assessment
	–	~	NHS, KIS, LIKI, SEBI	The current values are still far from the target range. The forest sub-indicator alone is close to the target range, at slightly above 80%. If the trend does not change, the target of 100% in 2015 cannot be attained without considerable additional effort, ideally in all relevant policy areas, at national, federal state and municipal level.
	–	–	KIS, SEBI	Calculated for the time being solely for vertebrates excluding marine fish, the indicator stands at 23% for 2009. Major species conservation efforts are needed to attain the target of 16% by 2020.
	–	–	SEBI	The index stands at 48% for the last reporting period (2001-2006). This is still far from the target. Considerable effort is therefore needed to improve the conservation status of most habitats and species.
	–	–	KIS, SEBI	Biodiversity is endangered in 2010 by 40 species on the draft management list from the Black List of Invasive Alien Species. Immediate action must be taken against six species on the draft action list.
	–	↗	KIS, LIKI, SEBI	The total size of strictly protected areas increased between 2000 and 2008 from 3.2% to 4.1% of the German land surface.
	– –	–	LIKI, SEBI	Only 10% of water bodies attained good or high ecological status in 2009. The most frequent causes of impairment are changes in the structure of water bodies and large nutrient inputs from agriculture.
	–	–	–	Overall, the major German river floodplains are severely modified (indicator value 19% in 2009). Great efforts continue to be required to conserve and develop biodiversity in river floodplains.
	– –	↗	NHS, KIS, LIKI	The four-year running average fell from 129 ha per day in 2000 to 94 ha per day in 2009. Despite the positive trend, the current value is still very far away from the target. Instruments to reduce the increase in land use must consequently be reinforced and systematically applied.
	–	–	KIS, LIKI, SEBI	The proportion of undissected low-traffic areas with a minimum size of 100 km² decreased from 26.5% to 25.4% between 2000 and 2005. In the same period, the effective mesh size (M_{eff}) decreased from 84 km² to 81 km². Investment is to be focused in future on the network of existing transport axes.

Indicator	Variable measured or observed	Last value reported	Target	
Economic activities				
Agri-environmental measures	Total supported area under agri-environmental measures and funding granted for this area	4.8m ha €603m (2007)	–	
Organic farming	Area of organically farmed land as a percentage of the total agricultural land area	5.6% (2009)	20% (no year specified)	
High nature value farmland	Area proportion of high nature value farmland as a percentage of the total farmland area	13.0% (2009)	19% in 2015	
Genetic diversity in agriculture	Percentage share of endangered indigenous farm animal breeds (horse, cattle, pig, sheep and goat)	83% (2010)	Reducing endangerment to farm animal breeds	
Genetic engineering in agriculture	Total area notified under cultivation with genetically modified plants (GMPs)	0 ha (2009)	–	
Agricultural nitrogen surplus	Difference between nitrogen flows into and out of agriculture (overall balance)	105 kg/ha per year (2007)	80 kg/ha per year in 2010	
Exceedance of critical loads for nitrogen	Proportion of area in which ecosystem-specific critical loads of nutrient nitrogen are not exceeded	4.3% (2004)	100% in 2020	
Sustainable forestry	Proportion of forest area certified according to PEFC and FSC respectively as a percentage of the total forest area	69% / 4% (2009)	80% in 2010	
Climate change				
Climate change and onset of spring	Temporal shift in the beginning of apple blossom (nationwide average date of the beginning of apple blossom) as a result of climate change	20 April (2009)	No further shift towards an earlier date in onset of phenological full spring	
Public awareness				
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	22% (2009)	75% in 2015	

	Status	Trend	Indicator system	Core assessment
	–	–	KIS	After a slight increase in the previous funding period, the start of the current funding period has brought a decrease in funding. Funding needs to be directed to a greater extent towards the conservation and sustainable use of biodiversity.
	– –	↗	NHS, KIS, LIKI, SEBI	The proportion of organically farmed land area is continuously increasing (5.6% in 2009), but is still very far from the 20% target. It is planned to structure the conditions for conversion to organic farming in such a way that organically farmed land area can increase to 20% of the total agricultural land area in coming years.
	–	–	SEBI	In 2009, exceptionally high, very high and moderately high nature value farmland area accounted for 2.2%, 4.5% and 6.3% of the total farmland area respectively (adding up to a 13.0% 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.
	–	–	SEBI	The proportion of endangered indigenous breeds (MP, CP and PCP) is very high at slightly over 83% in 2010. Specific action must be taken to reduce the threat situation.
	–	–	KIS, LIKI	After ongoing growth from 2005 to 2008, the area under cultivation with GMPs fell back to zero in 2009 following suspension of approval for the MON 810 Bt maize variety.
	–	↗	NHS, KIS, LIKI, SEBI	From 1991 to 2007, the yearly nitrogen surplus fell from 132 kg/ha to 105 kg/ha (three-year rolling average). The current value is far above the target of 80 kg/ha per year.
	– –	–	KIS, SEBI	Critical loads were not exceeded only in 4.3% of the assessed area of sensitive ecosystems in 2004. While atmospheric nitrogen inputs from transport and industry decreased from 1990 to 2004, there is so far no downward trend in ammonia emissions and the resulting nitrogen inputs from farming.
	+	↗	KIS	In 2009, 69% of all forest area was PEFC-certified and 4% was FSC-certified. The total is close to the target range. Further certification according to high-quality ecological standards is needed to attain the 80% target.
	–	↘	KIS, LIKI	The onset of phenological full spring has shifted significantly towards an earlier date since the late 1980s. In 2009, this was dated to 20 April, only one day after the earliest beginning of blossom in the assessment period from 1951 to 2009.
	– –	–	SEBI	In 2009, 22% of the population have at least sufficient awareness of biodiversity. As the current indicator value still remains very far away from the target, greater effort is needed to communicate the importance of biodiversity addressing various audiences in a targeted manner.

4

Outlook

As can be seen from the summary table, not all thematic areas in the National Strategy on Biological Diversity are adequately represented with indicators yet. Work on two further indicators is underway for the thematic areas of urban sprawl and sustainable marine fisheries. These indicators will be presented in the next update of this Indicator Report.

Urban sprawl

Growth in land use for settlement and transport is paralleled by urban sprawl in the remaining landscape. Urban sprawl is driven in particular by a pronounced dispersion of new settlement areas. Human settlements cause disturbances such as noise, light and emissions of substances in their vicinity and, therefore, planners must pay more attention to adverse impacts on biodiversity including the spatial dimension of settlement development. Besides adding to pressures on the ecological functions of the countryside, dispersed development also leads to more traffic, higher energy consumption and increased costs for infrastructure construction and maintenance.

Effects of urban sprawl are not addressed by the 'Increase in land use for settlement and transport' indicator presented in Section 2.2. As planned in the National Strategy on Biological Diversity, an urban sprawl indicator is being developed to complement the indicator on the increase in land use for settlement and transport. The urban sprawl indicator will link spatial aspects of the development of settlement areas with related impacts on biodiversity.

Sustainable marine fisheries

Sustainable, ecosystem-friendly fisheries are vital to the conservation of biodiversity in German marine waters. At the Johannesburg World Summit on Sustainable Development in 2002, the European Union and its member states pledged to maintain or, until 2015, restore fish stocks to levels that assure maximum sustainable yield (MSY). This is an important interim target on the way to attaining also a good environmental status for the marine environment, which EU member states aim to achieve in their marine waters by 2020 under the Marine Strategy Framework Directive adopted in 2008. The specific objective is to increase spawning stock biomass, i.e. the biomass of all reproducing individuals in a population. A fishery is not deemed sustainable unless spawning stock biomass is above and fishery mortality is below the corresponding MSY reference levels. Adjusting the size of the catch to the available resources ensures that fisheries are sustainable while reducing adverse impacts of fisheries on marine biodiversity. For key commercial fish stocks in the North Sea and the Baltic Sea, this entails a reduction in catch sizes from current levels.

The 'Sustainable marine fisheries' indicator will report the number of stocks of fish, crustacean and invertebrate species fished sustainably that have at least part of their range in German North Sea and Baltic Sea waters. To date, the competent International Council for the Exploration of the Sea (ICES) has only assessed those stocks analytically for which sufficient data are available. These are generally stocks of major economic importance with catch sizes to match. So that the newly developed indicator has broader information value than the Marine Trophic Index (MTI) used previously, the future intention is to perform analytical assessments and to determine fisheries mortality limits based on maximum sustainable yields, as far as possible, for all commercial fish stocks. Corresponding reference levels for each of the commercial fish stocks are currently the subject of consultation between the competent authorities.

School of Herring (*Clupea harengus*)

The National Strategy on Biological Diversity also contains various other thematic areas – for example 'Mining of raw materials and energy generation' or 'Combating poverty and development cooperation' – for which no indicators have yet been developed. Similarly, impacts of climate change on biodiversity are inadequately covered by the sole indicator on climate change and the onset of spring.

The indicator set presented in this report is already a further development of the indicator set contained in the 2007 National Strategy on Biological Diversity, but it is not to be regarded as final. Its development still needs to continue in order to improve the information provided on the effectiveness and success of the strategy.

5

Literature

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