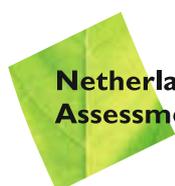
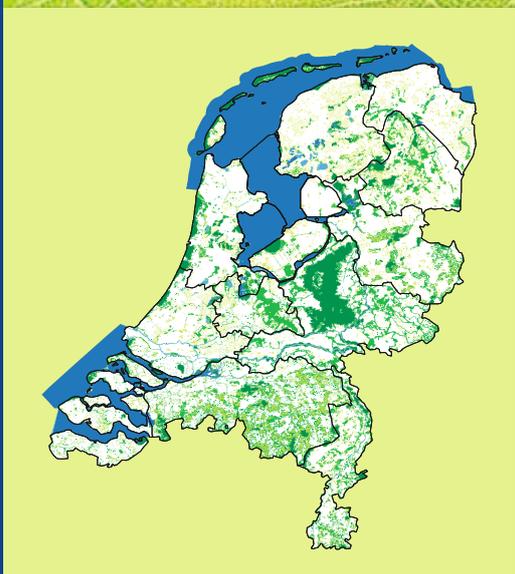


# Halting biodiversity loss in the Netherlands

Evaluation of progress



**Netherlands Environmental  
Assessment Agency**

## Colophon

Netherlands Environmental Assessment Agency (PBL)

Wageningen University and Research Center (WUR)

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In the series 'Indicators for the Convention on Biodiversity 2010' the following documents have been published by the Statutory Research Tasks Unit for Nature and the Environment (Wageningen):

Reijnen, M.J.S.M. (2007) National Capital Index version 2.0. Report 53.1, Statutory Research Tasks Unit for Nature and the Environment. Wageningen, the Netherlands.

Windig, J.J., M.G.P. van Veller & S.J. Hiemstra. (2007) Biodiversiteit Nederlandse landbouwhuisdieren en gewassen. Report 53.3, Statutory Research Tasks Unit for Nature and the Environment. Wageningen, the Netherlands.

Melman, Th.C.P. & J.P.M. Willemsen. (2007) Coverage protected areas. Report 53.4, Statutory Research Tasks Unit for Nature and the Environment. Wageningen, the Netherlands.

Weijden, W.J. van der, R. Leewis & P. Bol. (2007) Indicatoren voor het invasieproces van exotische organismen in Nederland. Report 53.6, Statutory Research Tasks Unit for Nature and the Environment. Wageningen, the Netherlands.

Nijhof, B.S.J., C.C. Vos & A.J. van Strien. (2007) Influence of climate change on biodiversity. Report 53.7a, Statutory Research Tasks Unit for Nature and the Environment. Wageningen, the Netherlands.

Moraal, L.G. (2007) Effecten van klimaatverandering op insectenplagen bij bomen. Report 53.7b, Statutory Research Tasks Unit for Nature and the Environment. Wageningen, the Netherlands.

Fey-Hofstede, F.E. & H.W.G. Meesters. (2007) Exploration of the usefulness of the Marine Trophic Index (MTI) as an indicator for sustainability of marine fisheries in the Dutch part of the North Sea. Report 53.8, Statutory Research Tasks Unit for Nature and the Environment. Wageningen, the Netherlands.

Reijnen, M.J.S.M. (2007) Connectivity/fragmentation of ecosystems: spatial conditions for sustainable biodiversity. Report 53.9, Statutory Research Tasks Unit for Nature and the Environment. Wageningen, the Netherlands.

Gaaff, A. & R.W. Verburg. (2007) Government expenditure on land acquisition and nature development for the National Ecological Network (EHS) and expenditure for international biodiversity projects. Report 53.11, Statutory Research Tasks Unit for Nature and the Environment. Wageningen, the Netherlands.

Elands, B.H.M. & C.S.A. van Koppen. (2007) Public awareness and participation. Report 53.12, Statutory Research Tasks Unit for Nature and the Environment. Wageningen, the Netherlands.

Information for the indicators in this leaflet was also obtained from: MNP (2007). *Natuurbalans 2007*. MNP Bilthoven.

CBD/MNP (2007). *Cross-roads of on Earth; Exploring means to meet the 2010 biodiversity target*. Solution-oriented scenarios for the Global Biodiversity Outlook 2. CBD Technical Series No. 31. /MNP report 555050001. Secretariat of the Convention on Biological Diversity en Milieu- en Natuurplanbureau, Montreal en Bilthoven.

Rood, T. R. Alkemade (2005). *De Nederlandse invloed op mondiale biodiversiteit; Averechtse effecten van schijnbaar duurzame oplossingen*. ArenA, Jaargang 11, 2005. MNP (2007) *Natuurbalans 2007 (State of the Nature 2007)*.

Netherlands Environmental Assessment Agency (MNP), Bilthoven, the Netherlands.

MNP (on internet) *Milieu- en Natuurcompendium*. <http://www.milieuennatuurcompendium.nl>. Netherlands Environmental Assessment Agency (MNP), Bilthoven, the Netherlands.



# Halting Biodiversity loss in the Netherlands by 2010

The Member States of the European Union have set a target to halt the loss of biodiversity by 2010. This brochure is a first attempt to evaluate the progress towards the 2010-target in the Netherlands, by means of the set of headline indicators as selected under the Convention on Biological Diversity, the European Environment Agency and European Union.

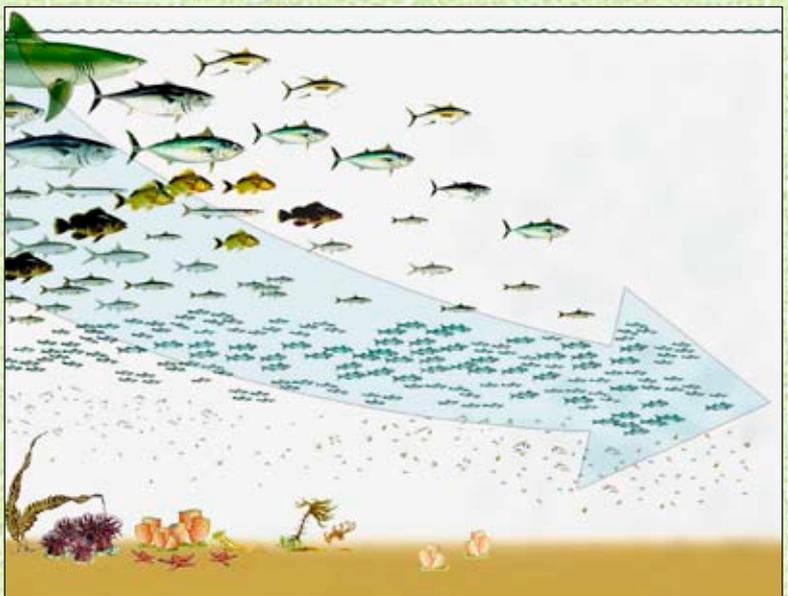
## Can biodiversity loss be halted by 2010?

The efforts to halt biodiversity loss in the Netherlands started effectively with the National Ecological Network and nature development. This resulted in an increase in natural areas, from 1990 onwards. Together with environmental policy that diminished environmental pressure, this has gradually slowed down the rate of biodiversity loss.

Is biodiversity preserved in the Netherlands? Although the loss has slowed down, it is on a low biodiversity level. Moreover, the number of Red Listed species increases, which shows that species depending on specific habitats and environmental conditions are still declining. In the agricultural sector, the genetic diversity is rapidly declining because of the selection of the most productive breeds. Effectively, biodiversity in the Netherlands continues to homogenise. Generalist species which are advantaged by the human environment increase in number, while many specialist species decrease. The Dutch global biodiversity footprint shows that an area of about three times the size of the Netherlands is used to satisfy Dutch consumption, and this area is growing.

## The process of biodiversity loss: homogenisation

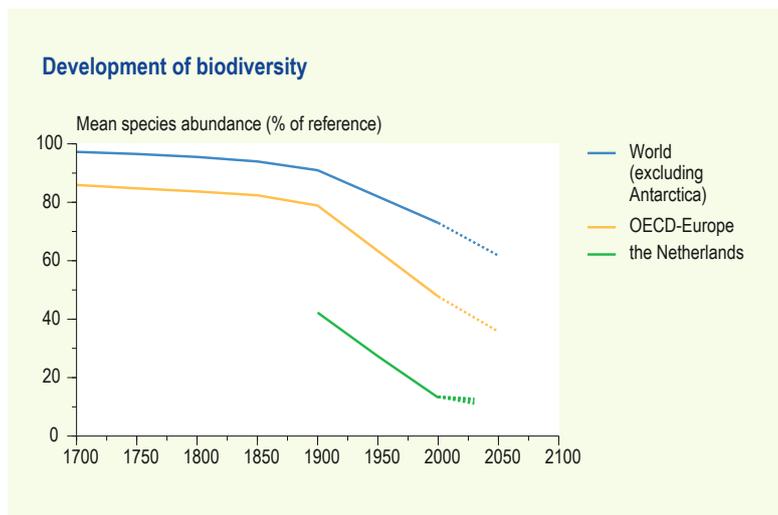
When people intervene in ecosystems, many original species decrease in abundance while a few other, opportunistic species increase in abundance. Remarkably, the local 'species richness' initially increases due to these opportunistic species. Because this limited group is becoming more and more dominant, ecosystems lose their characteristic species and become more and more alike: homogenisation. As a result, the number of species at the local scale stays (nearly) the same, but it concerns the same species everywhere. Generally, the losers are large bodied, long-lived species that reproduce slowly. Homogenisation also takes place in agro-genetic diversity. The initial high diversity in crop varieties and breeds of livestock adapted to local environmental shifts towards an ever smaller group of highly productive crop varieties and breeds of livestock, suitable for standardised agri-environments. Daniel Pauly has illustrated the homogenisation process nicely with his 'fishing down the food web' figure. *Source: Pauly et al., 1998*



# Biodiversity loss is slowing down

## Trends in species and ecosystem extent

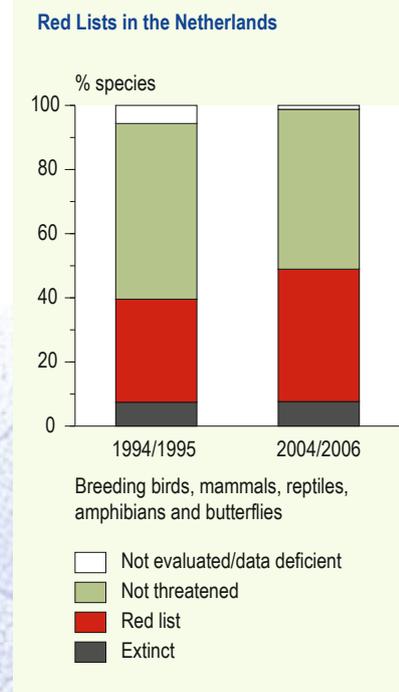
In the 20th century, species biodiversity decreased from a mean species abundance of about 40% in 1900 to about 15% in 2000. A mean species abundance of 15% means that the populations of species are on average 15% of that in the near natural state. The loss is mainly caused by land use change, environmental pressure and fragmentation of ecosystems.



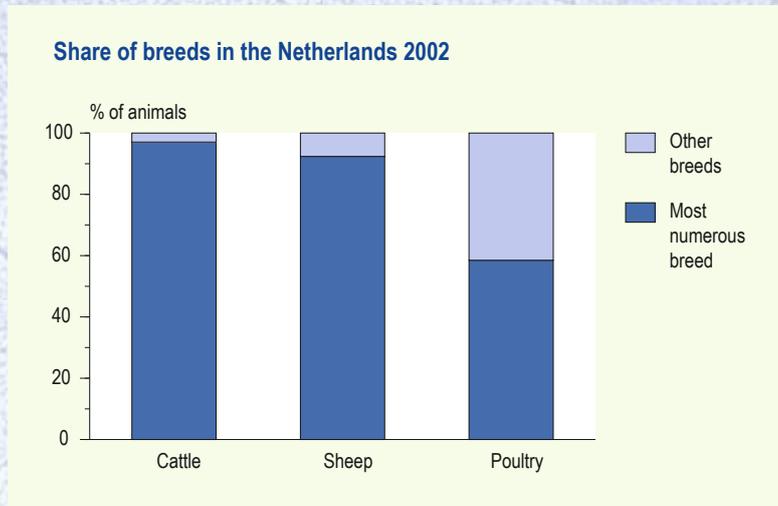
In the Netherlands the loss of biodiversity is slowing down, but at a low biodiversity level. Looking in more detail, heath lands, semi natural grasslands and agriculture are still in decline. Forests and dunes stabilise and even show local improvements. *Sebi-indicator 1. Source: Netherlands Environmental Assessment Agency*

further decline. As a result, the number of species of birds, mammals, reptiles, amphibians and butterflies on the Red List increased during the past decade. A number of species disappeared entirely from the Netherlands over the last century, varying from about 5% of the birds and vascular plants to about 25% of butterflies. Species dependent on clear, meandering streams decreased most, for example, 45% of the stoneflies became extinct. *Sebi-indicator 2. Source: RAVON, SOVON, VZZ, Vlinderstichting*

**Red List** Some of the species are under so much pressure that they have been classified on the Red List. Many Red Listed species show



**Agro-genetic diversity** Dutch livestock largely consists of a few highly productive, globally used breeds. Cattle and sheep are both almost entirely of a single breed. The globally dominant production breed of sheep is of Dutch origin: 'Texelaar'. In poultry, 99.98% are globally-used commercial breeding lines. The remaining

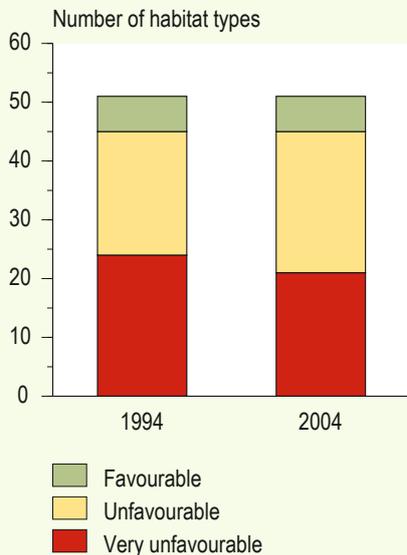


0.02% consist of about 20 old Dutch breeds. The selection of a few breeds across the world has resulted in a very low genetic diversity in production breeds. Essentially, this homogenisation process is similar to the replacement of the original species in wild biodiversity.

*Sebi-indicator 6. Source: WUR, Animal Science Group, Lelystad.*

# at a low biodiversity level

## Conservation status habitat types in the Netherlands

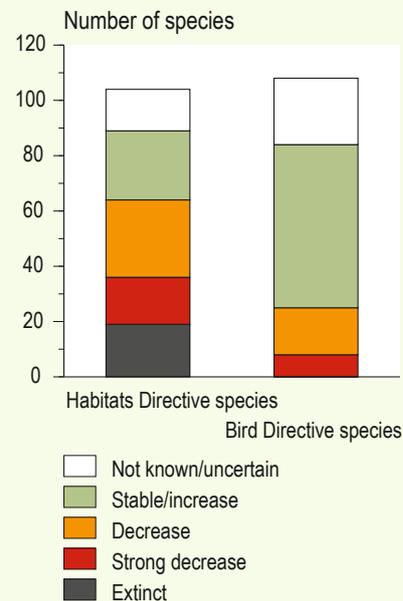


declining populations, their distributions become smaller in the Netherlands or they experience habitat deterioration. *Sebi-indicator 3. Source: Department of LNV.*

**Habitats in the Habitats Directive** Most of the 51 Dutch habitats that are protected by the Habitats Directive have an unfavourable conservation status. Many of these habitats are of European importance, especially those that reflect the delta character of the Netherlands. A little improvement has been made in the last decennium. *Sebi-indicator 5. Source: Department of LNV.*

**Species on the Birds and Habitats Directives** About two thirds of the species that are protected by the Habitats directive are in decline. For the birds protected under the Birds Directive, about one fifth is in decline. Migrating birds fare relatively well, in contrast to breeding bird species. As a result, two thirds of the species protected under the Birds and Habitats Directives have an unfavourable conservation status. These species have

## Trend species Bird and Habitats directive in the Netherlands



**Protected areas** In the last two decades protection measures stopped further loss of natural areas. In 1990, the National Ecological Network commenced to improve, connect and extend natural areas. It turned the nature loss into a gain, mostly by developing nature on former agricultural lands to connect nature areas. Nature areas and landscapes are protected by a number of regulations. Nature areas are designated and protected as part of the 'National Ecological Network' (under national policy) and Natura 2000 (under the Birds and Habitats Directives), the latter of which forms about half of the 'National Ecological Network'. Natura 2000 areas are protected by law, the 'National Ecological Network' by planning restrictions. Some areas outside the 'National Ecological

Network' are owned and managed by conservation-oriented organisations and persons. Parts of the agricultural landscape are designated as being valuable and their maintenance is subsidised by biodiversity supportive management schemes. *Sebi-indicator 7/8.*

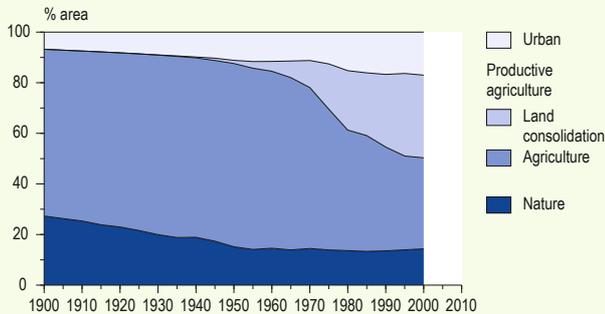
Source: Department of LNV, WUR Alterra

## Protected areas



# Pressures decline

Land use change in the Netherlands



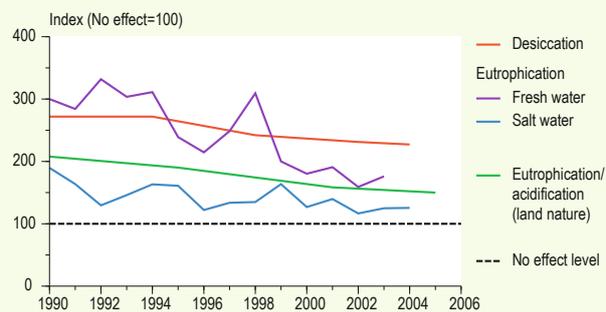
**Land use change** In the first half of the 20th century, nature areas have been converted to agriculture on a large scale. In the second half of the 20th century, land use became more and more intensive. Small farms were transformed into large farms with high input and industrial management practices. Natural and semi-natural elements, such as hedges, ditches and tree patches were decimated. This intensification (and land consolidation) has an ongoing negative effect on biodiversity, both inside and outside the agricultural areas. Since 1990, the loss of natural area has been reversed. Some remaining areas of the traditional agricultural system are protected as nature reserves, agri-environmental schemes are put in place and organic farming is promoted.

Urban areas also expanded during the second half of the 20th century, although to a lesser extent. They also boosted infrastructure and recreational use. *Sebi-indicator 4. Source: Statistics Netherlands.*

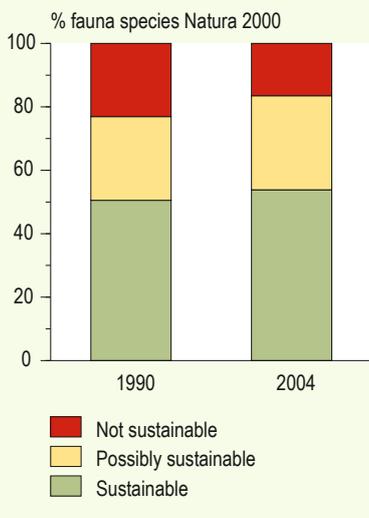
## Environmental pressure

Environmental pressures have diminished over the past decades. Nutrients loads in terrestrial and aquatic habitats have been significantly lowered. However, current nitrogen deposition exceeds the critical limits, ground water tables are too low and aquatic ecosystems are eutrophied. As a result, nutrient poor and (ground)water dependent habitats are still under threat. Dry and moist heath, bogs, forests and (semi)

Environmental pressure on nature in the Netherlands



Spatial conditions for biodiversity in the Netherlands



natural grasslands are most affected. *Sebi-*

*indicator 9. Source: Netherlands Environmental Assessment Agency.*

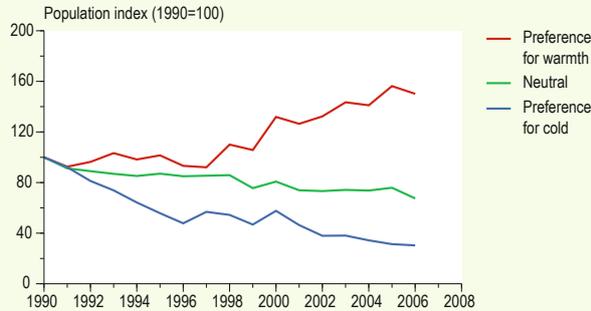
## Fragmentation

Habitat loss and fragmentation impact the spatial conditions of a large number of species. By 1990, the spatial requirements for 50% of the Natura 2000 fauna species were, possibly, not met. The National Ecological Network slowly counters fragmentation, however, after completion the spatial requirements will still not be met for 15-45% of the species. Fragmentation is most serious in marshes, moist grasslands, streams and lakes. Parts of the dunes and heathlands are fragmented, too, and do not fit the needs of their characteristic species.

*Sebi-indicator 1.3. Source: WUR, Alterra, Wageningen.*

# but not sufficiently

## Climate sensitive species in the Netherlands



## Climate change

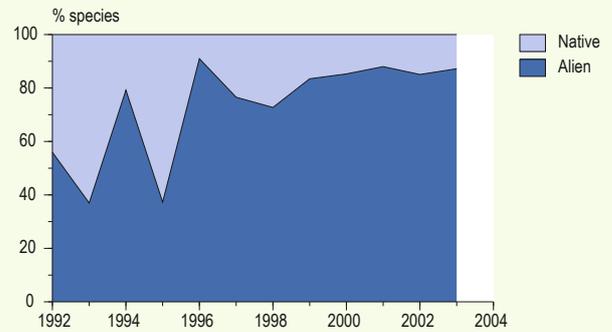
Climate change causes shifts in species distribution and enlarges the growing season of plants. Distribution shifts are noticeable even in a country as small as the Netherlands. For a selection of species in the Netherlands, the trends show that populations of species with a preference for a cool environment decrease, while species that prefer warmth increase.

Sebi-indicator 11. Source: WUR, Alterra, Wageningen.

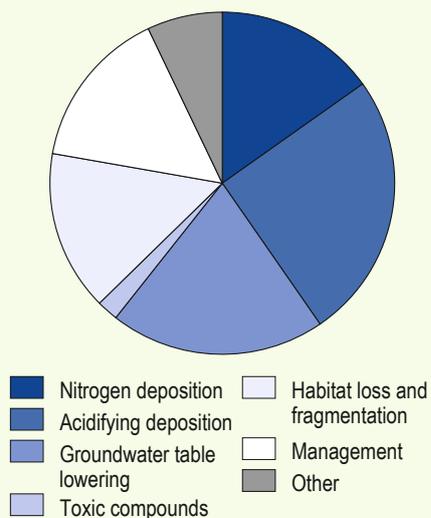
## Aliens species

New species enter the Netherlands because of new water connections and international transport routes. A well documented example is the Danube-Rhine canal that connects the Danube and Rhine fauna and flora. Nowadays, alien species outnumber the original species in the large Dutch rivers. The native species still occur, and it is not clear yet to what extent alien species are invasive and replace native ones. On land, at least 145 plant species settled in the Netherlands, most in urban regions.

## Alien and native species in River Meuse



## Share per pressure of biodiversity loss in the Netherlands since 1950



The speed with which they do so is increasing, up to two species per year. Also climate change enables pest insects from other continents to settle.

Sebi-indicator 10. Source: Waterdienst, Lelystad

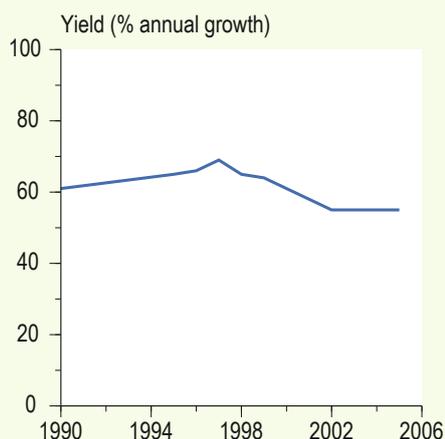
## Share per pressure

A start has been made to calculate the extent to which pressures and sectors have contributed to the biodiversity loss since 1950. The environmental pressures acidification, eutrophication, lowering groundwater tables and heavy metals are estimated to account for about 60% of the loss. Habitat loss, fragmentation and management are estimated to have caused a loss of about 30% since 1950. The remaining loss can be attributed to various pressures, including climate change. Before 1950, habitat loss was the dominant cause. Source: Netherlands Environmental Assessment Agency

# Sustainable use not on track yet, in

'Sustainable use' means that ecological, economic and social functions of ecosystems are maintained and well balanced. This also applies to products imported from elsewhere in the world. The use of natural resources in agriculture, forestry and fisheries, is one for which sustainability challenges has been set.

## Sustainable use of forests in the Netherlands



## Forest

In the last decades, integrated forest management has been put in place, aiming at multiple functions of the forest (wood production, recreation, nature). Forests grow older and due to its management, their biodiversity is improved. The amount of dead wood is still low compared to that of natural forests (about 100 m<sup>3</sup>/ha), but has increased from 4 to 9 m<sup>3</sup>/ha since 1990. This supports the recovery and increase of fungus and invertebrate species.

From an economic point of view, forest trees increase their volume and become thicker, as they grow older. The annual harvest is around 60% of the annual growth (ca. 2.5 million m<sup>3</sup>/year) and accounts for around 10% of the Dutch internal timber and pulp demand. This explains the large Dutch biodiversity footprint for wood products corresponding with an area the size of 49% of the Netherlands that has lost its entire biodiversity.

Sebi-indicator 17. Source: WUR Alterra

## Agriculture

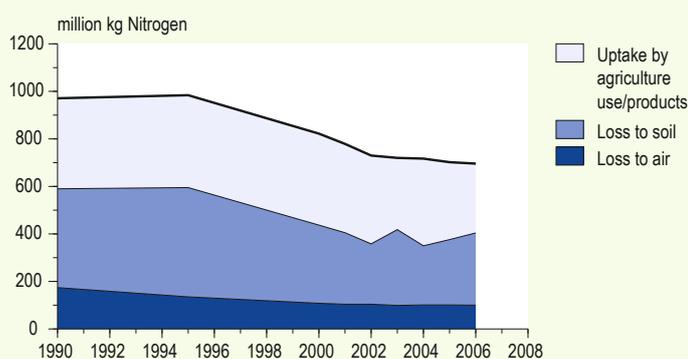
High Nature Value farmland decreased from 100% in 1950 to about 15% today caused by intensification and high nitrogen inputs. Half of the nitrogen input in agricultural land is lost to air (about 10%) and soil (about 40%). The total input of nitrogen has diminished with about 25% compared to 1995.

Biodiversity on agricultural lands is still declining, notwithstanding biodiversity supportive agri-environmental schemes. For example, most meadow birds show a continuing decline.

At the moment, organic farming accounts for 2.1% of the Dutch agricultural land. The number of organic farms increased from around 400 farms in 1990 to around 1300 farms in 2006, and decreased for the first time in 2007.

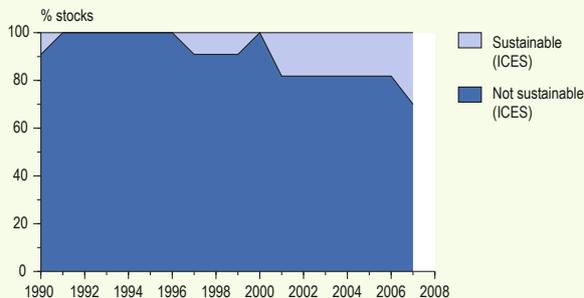
The biodiversity footprint for food corresponds with an area the size of 105% of the Netherlands that has lost its entire biodiversity. *Sebi-indicator 19/20. Source: Statistics Netherlands*

## Agricultural nitrogen input in the Netherlands



# forestry, agriculture and fisheries

Stocks unsustainably fished in the Greater North Sea



## Fisheries

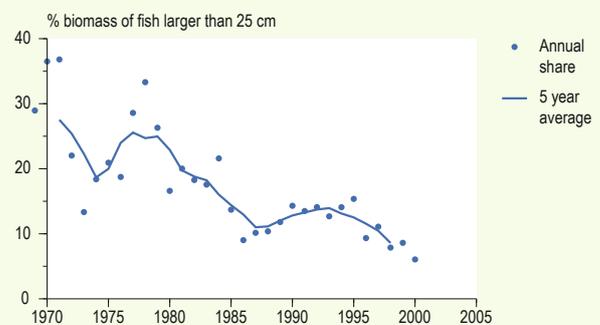
Fishing for most commercial fish stocks in the North Sea does not meet the sustainability criteria of the ICES, regarding spawning biomass and fish mortality. For example, the stocks of Cod and Sole are below their biologically safe numbers. The collateral damage caused by the fishing gear is high. An estimated 75% of the catch is discarded, and in most cases does not survive. Although it has not been measured in detail, yet, biodiversity does not appear to be improving in the North Sea. *Sebi-indicator 21. Source: ICES.*

Fishing has influenced the distribution of fish sizes in the North Sea: large species, as well as large individuals have disappeared and smaller sizes dominate. In response, fish mature earlier and at a smaller size. This process is called fishing down the food web, and is part of the homogenisation process. *Sebi-indicator 12.*

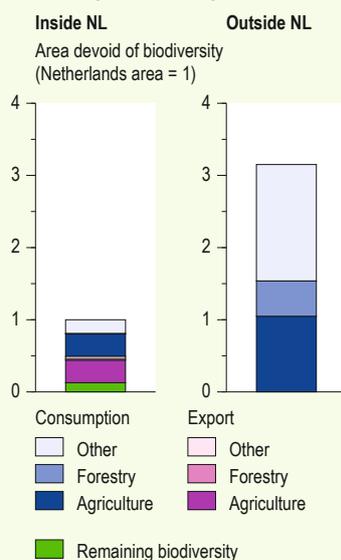
Source: Waterdienst.

From an economic point of view, the income from fisheries in the Dutch part of the North Sea has decreased with 38% from 1990 to 2003. The continually dwindling numbers of fish caught in the North Sea, contribute to a further decrease in income and employment.

Large fish in catches in the Netherlands



Biodiversity loss due to Netherlands consumption and export 2000



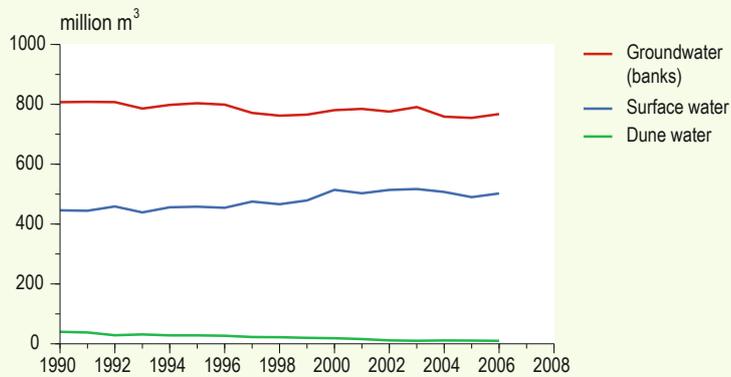
## Footprint

The total Dutch biodiversity footprint on land outside the Netherlands corresponds with an area of about 3 times the size of the Netherlands that has lost its entire biodiversity. Outlooks predict that this area will further increase, showing a continuing impact of Dutch consumption on global biodiversity. In the Netherlands itself, biodiversity is lost because land is used for Dutch consumption and for export products. *Sebi-indicator 23. Source: Netherlands Environmental Assessment Agency.*

Agency.

# Ecosystem services are used,

## Water extraction in the Netherlands



## Drinking water

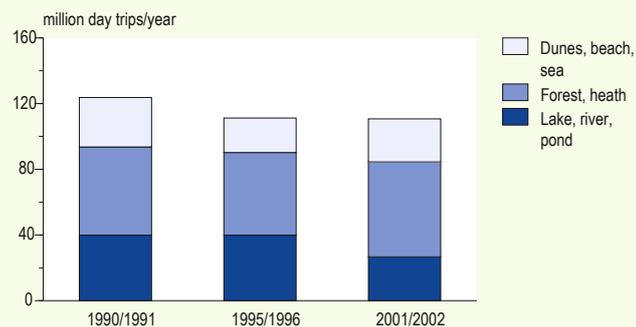
The natural environment delivers goods and services. Drinking water is entirely produced from the natural environment. Its main source is ground-water, followed by river water. Extraction of water potentially damages biodiversity by lowering water tables. The production of drinking water from sand dunes has been almost stopped, which contributes to the slight recovery of biodiversity in those areas. *Sebi-indicator 16. Source: VEWIN.*

## Public awareness and participation

An urbanised country, such as the Netherlands, heavily depends on natural areas for recreational use. In 2001/2002, the combined nature areas in the Netherlands drew about 110 million day visitors (a visit of at least 2 hours), which is a decline from 1990/1991. Visitors' main activities are walking, cycling, sunbathing, swimming and having a picnic. Questionnaires indicate that natural areas are visited more frequently than other recreational destinations, such as fun parks.

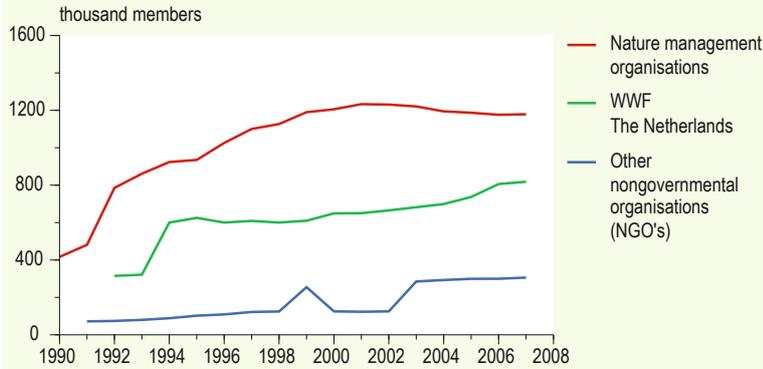
*Sebi-indicator 26. Source: Statistics Netherlands..*

## Day trips to nature areas in the Netherlands



# public awareness high but decreasing

Membership nature conservation organisations in the Netherlands



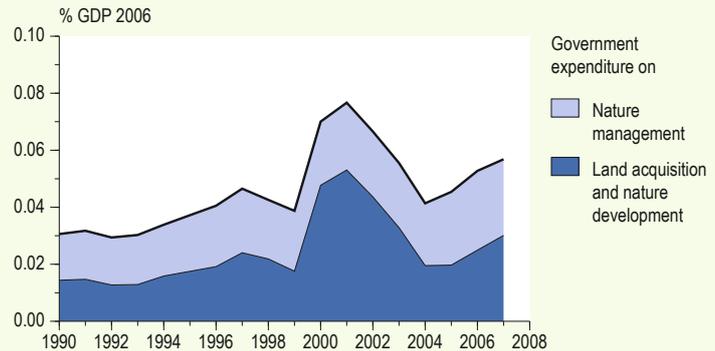
The awareness of the need for nature protection is reflected in the number of people who financially support non-governmental nature conservation organisations, such as Natuurmonumenten and the World Wildlife Fund. Most Dutch citizens show a high to medium awareness of the importance of nature protection. Only a limited group (around 10%) rejects the need for nature protection. However, the group most aware of the need for nature protection has decreased from 42% in 2001 to 30% in 2006. *Sebi-indicator 26.*

Source: Netherlands Environmental Assessment Agency.

## Funding to biodiversity

To halt biodiversity loss, the Dutch government acquires land to be reconverted to natural areas in order to enlarge and defragment the currently scattered ecosystems. The government also subsidises nature management in natural and agricultural areas. The sharp rise between 2000 and 2003 reflects the 'nature offensive', which temporarily intensified reversion to nature. In 2007, the governmental expenditure on the National Ecological Network alone, was about 250 mln euros in 2007. In addition, nature conservation organisations and, to a lesser extent, the agricultural sector and several other parties cover part of the costs of nature and landscape conservation. Their share is about equal to that of the governmental, and, in total, the yearly costs in the Netherlands are about one billion euros.

Realisation and maintenance of the National Ecological Network (EHS) in the Netherlands



Another governmental budget is available for biodiversity protection outside the Netherlands and the European Union. This budget rose from 152 mln euros in 1996 to 350 mln euros in 2005 (both at 2005 price level), or 0.07% GDP in 2005. Additionally, 30 mln euros meant for biodiversity protection outside the Netherlands is funded by Dutch citizens through their support of NGOs, such as WWF and Greenpeace. *Sebi-indicator 25. Source: WUR LEI.*

The Member States of the European Union agreed to halt the loss of biodiversity by 2010. This brochure evaluates the progress towards the 2010-target in the Netherlands based on the set of 2010-indicators as selected for the Convention on Biological Diversity. They were further developed under the Streamlining European 2010 Biodiversity Indicators project (SEBI 2010; EEA Technical report No 11/2007). This evaluation is a first implementation of the 2010-indicators in the Netherlands (terrestrial area only).

A few other indicators have been added to complete the big picture. The indicators have been arranged in the focal areas: status, threats, sustainable use and ecosystems goods & services/ public opinion.

### **Findings:**

- Overall, biodiversity loss has not been halted yet. Homogenisation still continues.
- Nationally, at the ecosystem level, biodiversity loss is halting slowly, but at a low biodiversity level ( $\pm 15\%$ ).
- Looking in more detail, heathlands, grasslands and agriculture are still in decline. Forest and dunes show improvements.
- At the species level less-vulnerable species show improvements, while the most-vulnerable species show further decline. The Red List grows.
- Agro-genetic diversity of breeds is low and probably continues to decline.
- Most species and habitats of European interest are in an unfavourable conservation status.
- The biodiversity footprint for national consumption corresponds with an area of about 3 times the Netherlands that has lost its entire biodiversity (outside the Netherlands).
- Most pressures decrease, but not sufficiently.
- Sustainable use in fisheries, forestry and agriculture is not on track, yet.
- Public support and awareness is high, although slightly decreasing