FOURTH NATIONAL REPORT TO THE CONVENTION ON BIOLOGICAL DIVERSITY

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Executive summary

Overview of status of biodiversity

Hungary is situated in the Carpathian basin, which is a region under various climatic influences. This has resulted in the formation of the special biogeographical unit, namely the Pannonian biogeographical region (or Pannonicum), the largest part of which belongs to Hungary. Although the territory of the country is small in Europe, it is rich in unique natural resources.

More than 53,000 described species occur in Hungary, 82% of which are animals. 3% of the species are protected by national law; the number of protected species has grown by 6% (from 1,660 to 1,760) since 2003. Action plans for 22 animal and 21 plant species were published by ministerial decree since 2004. 17% of the 520 species occurring in Hungary evaluated in 2008 for the IUCN Red List of Threatened Species were found being somehow endangered in the global level. All vascular plant species were evaluated in 2007 for the Hungarian Red List; the proportion of endangered species at some level is 27.5%. Numbers have grown by 30% between 1989 and 2007. 69% of these species are protected by national law. 25% of the 211 species of European importance are in a favourable status, according to their monitoring between 2001 and 2006; the status of another 59% is inadequate or bad. 11% of their populations has been increasing, 22% is stable and 32% has been decreasing. Common bird populations on agricultural habitats are stable; forest bird populations show great fluctuations with no apparent long-term trend. The positive result of effective conservation efforts on species can be shown by examples such as the trend of great bustard (*Otis tarda*), a globally threatened flagship species; the Hungarian population of which has almost doubled since the early 1990s as a result of conservation measures.

According to a large-scale vegetation mapping conducted between 2003 and 2006, only 3.2-9.8% remains of Hungary's natural capital of former times and 67% of the endangered habitats are in a bad status. In recent years, the total area protected either by national or EU legislation has grown to 22% of the territory of Hungary. Between 2003-2008, 51 management plans of protected natural areas were adopted, and another 36 are currently under development. The important wetland areas have been declared Ramsar sites and the European Diploma sites, biosphere reserves and World Heritage sites have expanded as well. All Ramsar sites were integrated into the Natura 2000 network, which ensures sustainable wise management.

Hungary's per capita ecological footprint was 3.5 global hectares in 2005. As the corresponding biocapacity was only 2.8 hectares, the country had an ecological deficit of 0.7 hectares.

Regarding land use, 62.4% of the country is agricultural area; 1.3% of Hungary's territory is involved in organic farming. In 2006, the area of uncultivated land of 2-50 years was about 350,000 ha, where vegetation could start to regenerate.

Hungary belongs to a secondary centre of crop diversity, where high diversity of local types and landraces developed. Populations of several crop wild relatives live in protected natural habitats. In Hungary, 90 gene banks are involved in the conservation of approximately 150,000 accessions of plant and micro-organism genetic resources. According to FAO data, Hungary's main crop gene bank, the Research Centre for Agrobotany at Tápiószele, is among

the world's 15 largest national gene bank collections. It has an ex situ collection of seed-propagated plant genetic resources of 86,756 accessions of 1,877 taxa. Between 1996 and 2007, the number of registered cultivars has almost doubled. 46 traditional animal breeds of national importance are protected by law, the conservation of which takes place in specialized institutions but national parks are also involved in the maintenance of certain traditional animal breeds such as for instance the Hungarian Grey Cattle. Although genetic material stored in gene banks have increased, the diversity of fruit and vegetables accessible at the markets or supermarkets have decreased, therefore special effort is needed to revive the use of these varieties and the related traditional knowledge.

The forest area has grown in Hungary mostly with plantations; 20.3% of the country is forest area at the moment. The ratio of indigenous tree stocks exceeds 57%. The area of forest reserves has increased.

10.8% of the country's territory is covered by grasslands, having great nature conservation importance in European scale.

The most important threats to biodiversity are the general trends of economic development and pressures on ecosystems, the spread of invasive alien species, fragmentation of habitats (lands withdrawn from cultivation for the purposes of residential construction, green-field investment for linear infrastructure and shopping centres) and climate change. The effects of climate change can already be observed in Hungary: some tree species have been flowering earlier, bird migration patterns have been changing, new thermophile plant and moth species have appeared in the country, tree-dying and damages caused by insects have increased in forests.

Status of National Biodiversity Strategies and Action Plans

After a long preparation phase the National Biodiversity Strategy and Action Plan was approved by the Ministry of Environment and Water in 2004 but the process of government approval was stuck. In order to obtain government and parliament approval, the above mentioned NBSAP was reviewed in 2008. The reviewed version of the National Biodiversity Strategy has been incorporated into the third National Environmental Programme which is currently at the final stage of the interministerial and public conciliations. The third National Environmental Programme is to be approved by the Parliament in 2009.

In addition to the above, the successive National Environmental Programmes approved by the Parliament set the main policy objectives and priorities of the relationship of economy and environment, including the integration of environmental and biodiversity considerations in sectoral policies. As a part of the National Environmental Programme, the National Nature Conservation Master Plan determines the objectives and policy on conservation of nature and biodiversity.

Sectoral integration of biodiversity considerations

One of the key challenges for Hungary is how to reconcile conservation and environmental considerations with economic development and economic interests and achieve the real implementation of biodiversity principles in sectoral policies.

The main policy objectives are laid down in the successive National Environmental Programmes. During the development of national policies (legislation, strategies and programmes), inter-ministerial conciliation takes place. In this way, efforts are made to integrate biodiversity conservation aspects into sectoral and cross-sectoral policies.

In the National Agri-Environmental Programme, launched in 2002, the areas with significant natural value were addressed as a zonal target programme of Environmentally Sensitive Areas. The total size of highly important Environmentally Sensitive Areas is 1,980,000 hectares. A subsidy framework was established and farmers on some areas receive payments compensating losses resulting from environmentally friendly agriculture. The European Agricultural Fund for Rural Development provides new opportunities as well. Agri-environmental measures under the New Hungary Rural Development Plan will be implemented in 2009 in order to find the suitable balance between the compulsory conservational requirements and the possibility of voluntary measures; subsidies for such biodiversity-supportive measures will be eligible for farmers on ca. 914,000 ha.

The main objectives of the forestry policy are to assure the long-term environmental, economic and social benefits of forests; to harmonise the society's interests with forest owners' and economic interests; and to increase the forest area up to 25-27% of the territory of the country. However, the practical implementation of objectives promoting biodiversity conservation faces difficulties several times due to conflict of interests. The National Forest Programme for 2006-2015 states that during the conservation of forests not only species but the whole forest ecosystem should be considered. The integration of nature conservation objectives targeting the maintenance and conservation of forests could be achieved through the system of planning and controlling and the subvention of forest managers. On the basis of relevant legislation, plans concerning protected natural areas can only be approved in compliance with the opinion of the Minister of Environment and Water.

Regarding the fisheries sector, one of the specific objectives of the National Fisheries Strategic Plan 2007-2013 is to slow down the degradation of natural aquatic habitats, restock indigenous species and reduce the overpopulation of invasive fish species.

With regard to regional development, change in legislation has led to the greater integration of biodiversity considerations into spatial planning. Building permits or any other development permits can be issued for protected areas at a very limited scope and always subject to the prior approval by the nature conservation authorities.

The Hungarian Energy Policy for 2007-2020 does not have direct reference to biodiversity conservation; with regard to its objective on sustainability it primarily refers to mitigation activities such as controlling greenhouse gas emissions.

The National Tourism Development Strategy for 2005-2013, places a special emphasis on the integration of environmental concerns into the development of the tourism sector. The ecological objectives of the National Ecotourism Development Strategy are to maintain ecological diversity and to maintain and improve the environmental status of the certain destinations. In 2007, the "Year of Green Tourism' campaign was organised by the state; national park directorates developed special programme offers, services and information systems in tourism.

Environmental education is incorporated in the educational legislation. Every Hungarian public educational institution must develop its programme for school-based environmental education. The Nature Schools and Nursery Schools Programme, involving great number of schools and nurseries in Hungary, aims to make students become more familiar with the natural environment and biodiversity as well as to raise awareness about the importance of sustainable development and biodiversity conservation.

Sustainable management of natural resources and biodiversity is incorporated in the National Sustainable Development Strategy. Important fields of action are active protection of

natural values, integration, institutional protection, changing lifestyle and attitude, and participation.

One of the main objectives of the National Climate Change Strategy 2008-2025 is to maintain or possibly enhance the inherent adaptation capacity of biodiversity. It determines activities that need to be completed in order to promote local adaptation, to preserve and increase the existing biodiversity and maintain and improve the naturalness thereof, and to enhance the intercommunication through the landscape surrounding natural areas and to facilitate the migration of species.

The New Hungary Development Plan 2007-2013 integrates biodiversity conservation measures through its Environment and Energy Operational Programme. Main objectives are to protect and restore protected natural and Natura 2000 areas and assets and to support environmental education.

Hungary has been implementing several international and regional conventions and agreements relevant to biodiversity conservation. Moreover, sub-regional and bilateral cooperation exists with several countries with the aim to promote the conservation and sustainable use of biodiversity.

Chapter I - Overview of Biodiversity Status, Trends and Threats

I. General overview

Overview of status of biodiversity

Although Hungary comprises only 1 percent of the territory of the European Union, it is rich in unique natural resources. The Carpathian Basin is a very important part of Europe from the point of view of biological diversity. Hungary, situated in this basin, is a region under various climatic influences. These include the Atlantic climatic effect from the North, the Mediterranean from the South, the Continental from the East and the various microclimatic influences from the Carpathians and the Alps. These have all contributed to the evolution of an extraordinarily rich mosaic pattern of fauna and flora. Another factor having contributed to this mosaic-like feature and to the rich biodiversity was that during the last glacial period, the Carpathian Basin was at the edge of the ice sheet. The species forced south by the ice settled here, and after the thaw, some species remained in areas of Hungary which have colder microclimate. After the glacial epoch some species requiring warm climate, which had migrated to the South, could return to the Carpathian Basin too, contributing to the biodiversity of the country. As a result of the above, Hungary's location in the Carpathian Basin implies not only diversity but a particular uniqueness, too. Hungary boasts several species and communities which do not exist outside the country, as well as some others which are found in neighbouring countries, but not in other regions of the European Union. This uniqueness has resulted in the formation of the special biogeographical unit, namely the Pannonian biogeographical region (or Pannonicum), the largest part of which belongs to Hungary but some parts expand to the neighbouring countries.

Status of habitats

Between 2003 and 2006, large-scale vegetation mapping comprising the whole of Hungary was performed, and the results were integrated in a database called 'MÉTA'. According to this survey, around 13% of the country's territory is covered by near-natural vegetation. When accounting for the naturalness of this remaining area, the study revealed that only 3.2-9.8% remains of the natural capital of former times (the actual percentage depending on whether biodiversity or other ecosystem services were given priority at weighting). Figure 1. shows the differences in the value of Natural Capital Index (NCI) across the micro-regions of the country. The most intact areas are forested mountains; the most degraded ones are agricultural lowlands. Peaks in NCI values widely overlap with high amphibian and reptile diversity values (Figure 3.).

Figure 1. *Natural Capital Index map of Hungarian physical geographical microregion. Source: Czúcz et al. (2008).*

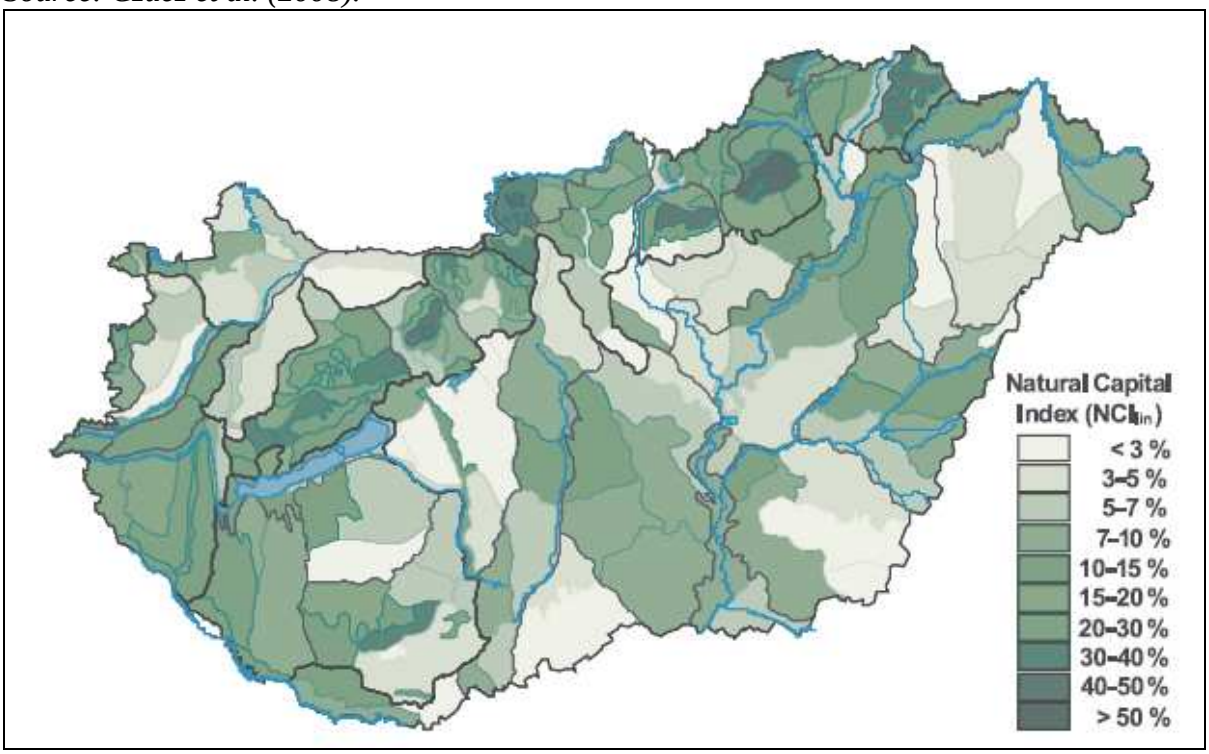


Figure 2. *Areas protected by national and EU legislation in Hungary. Source: Hungarian Ministry of Environment and Water.*

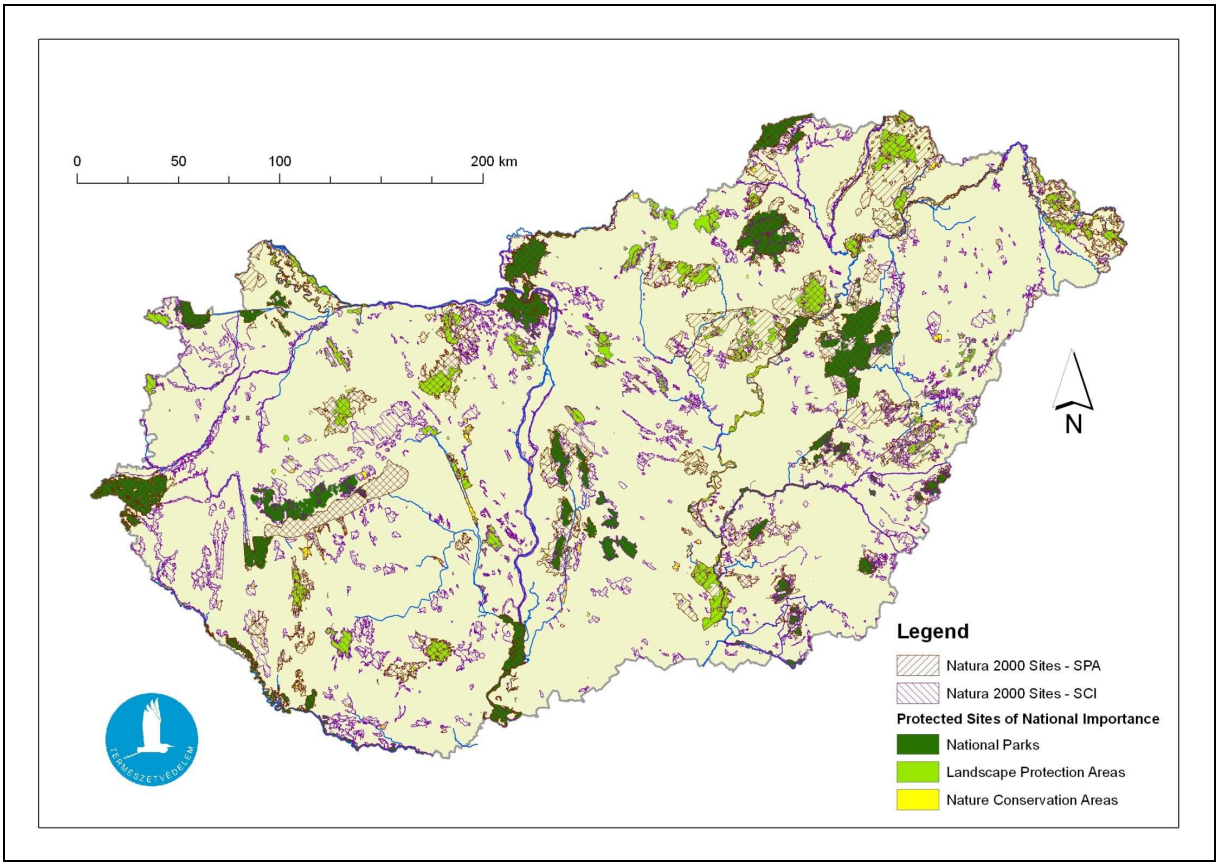
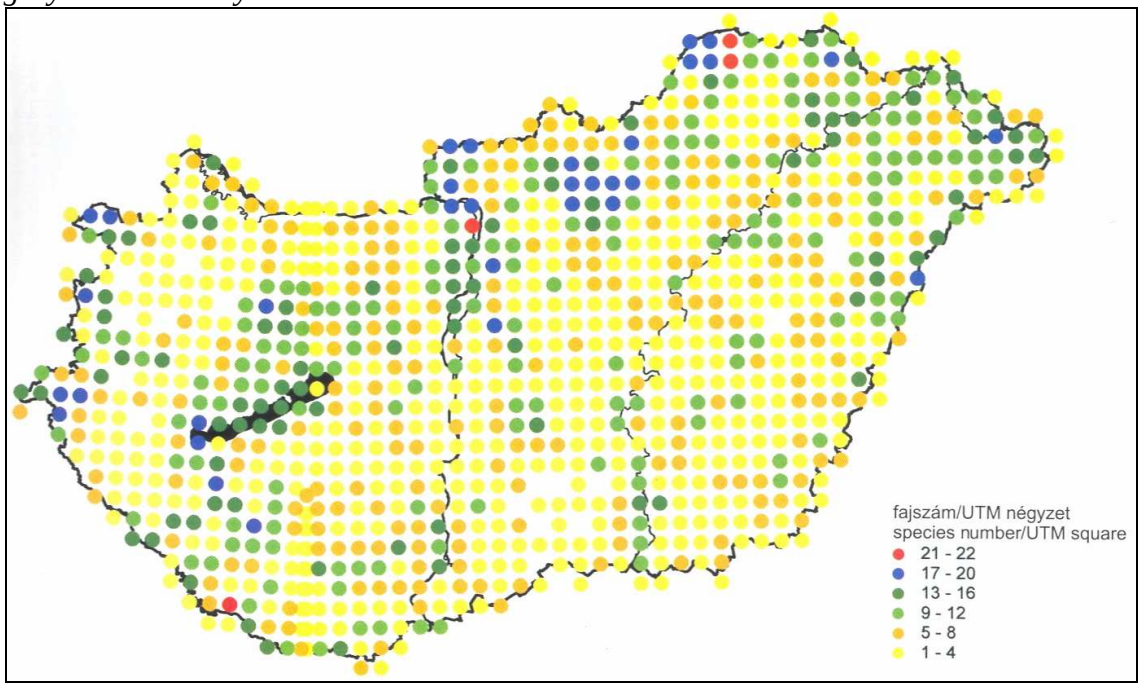


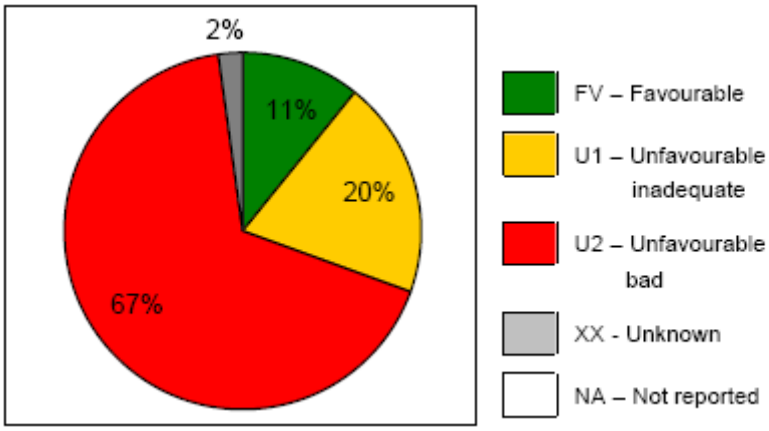
Figure 3. *Number of amphibian and reptile species in 10 km x 10 km UTM squares from Hungary. Source: Puky et al. 2005.*



According to the MÉTA-database, the least endangered habitat types are the rocky habitats, certain halophytic and aquatic habitats, open acidophilous woodlands, dry shrub vegetation with Crataegus and Prunus spinosa and the beech woodlands. The most seriously endangered habitats in Hungary are the following: sand and loess steppe oak woodlands, tussock sedge communities, extensive orchards, closed lowland oak woodlands, water-fringing and fen tall herb communities, wooded pastures, vegetation of loess cliffs, rich fens and Molinia meadows, Cynosurion grasslands and Nardus swards, swamp woodlands, xero-mesophilous grasslands and salt steppe oak woodlands.

46 endangered habitat types listed in the European Union Habitats Directive occur in Hungary. Their conservation status was assessed in regard to occurrence, size, status and structure between 2001-2006. 67% of these habitats were proven to be in a bad status, 20% inadequate and 11% favourable (Figure 4.).

Figure 4. *Status of Hungarian habitats protected by European Union's Habitat Directive Annex I. Source: European Commission (2007).*



Coverage of protected areas

9.4% of Hungarian territory is protected by national law (Figure 2., Table 1.). This ratio is 10.36% if registered ex lege protected bogs, mires and sodic lakes are included. In 2004 due to the EU accession, the Natura 2000 network was established based on the occurrence of 46 habitats and 232 species listed on the EU Habitats Directive and Birds Directive (Table 2). The resulting new network mostly (90%) overlaps with the areas protected by national legislation. Therefore the total area protected either by national or EU legislation has grown to 22% of the territory of Hungary (Table 2.). This number slightly exceeds the average value for the EU.

Table 1. *Summary statistics of areas protected by Hungarian law*

Conservation category	Number		Area (ha)		% of national territory
	Jan 2003	Dec 2008	Jan 2003	Dec 2008	Dec 2008
National parks	10	10	484,883	482,583*	5.2

Landscape protection areas	36	37	309,817	324,781	3.5
Nature reserves	142	163	25,927	30,109	0.3
Natural monuments	1	1	0	0	0
Protected natural areas of local significance	1,225	1,296	36,700	46,807	0.5
Sum of areas protected by national legislation	1,414	1,507	857,327	884,280	9.5

*The apparent decline of the area of national parks does not mean that their total size has decreased. It is due to (1) legal adjustment (all protected areas have been newly promulgated in Ministerial Decrees) and (2) switch to GIS database (current reviewed GIS data on size of protected areas are more accurate).

Table 2. *Summary statistics of Natura 2000 areas in Hungary*

		Ha (rounded up)	% of Hungarian territory	Mean in the EU	
Special Protection Areas*	55	1,397,000	15.02%		
Special Areas of Conservation*	467	1,351,000	14.52%		
Sum of Natura 2000 areas	512	1,968,000	21.0%	20%	*Special

Protection Areas and Special Areas of Conservation can overlap with each other.

The Act on Nature Conservation requires the national park directorates to elaborate management plans of protected areas (except for protected natural areas of local significance). Between 2003-2008, 51 management plans of protected natural areas were adopted, and another 36 are currently under development. The elaboration of management plans for Natura 2000 areas has started as well.

Hungary has declared six new sites with an overall extent of 79 thousand hectares to the Ramsar Convention on Wetlands. With the new ones, the number of Hungarian Ramsar sites has grown to 28 and their area to 233 thousand hectares. In 2004, all sites were included in the Natura 2000 network, which ensures the sustainable and wise management of these areas.

3 sites with a total area of 2,370.8 hectares have been awarded with the European Diploma (founded by the Council of Europe to help conserving protected areas with high geological, biological or landscape diversity).

5 biosphere-reserves have been declared in the end of the 1980s: they are located at Aggtelek, Lake Fertő, Hortobágy, Kiskunság and Pilis. In 2007, their legal status was actualized, and the core-areas have been promulgated.

Several sites with conservation and landscape protection value have received the World Heritage title: the old village of Hollókő and the surrounding landscape, the caves at the karst of Aggtelek and Slovakia, the Abbey of Pannonhalma and its natural surroundings, the Hortobágy National Park – the Puszta, the historic vine region of Tokaj. Ten other sites are waiting to be considered for addition to the list.

Diversity and conservation status of species

As mentioned above, the largest part of the Pannonian biogeographical region belongs to Hungary. Compared to other member states of the European Union, biodiversity in Hungary is relatively well preserved. For example, the number of nesting bird species and their abundance is remarkably high.

More than 53 000 described species occur in Hungary, 82% of them are animals. 3% of the species are protected by national law (Table 3.).

Table 3. *Number of species occurring in Hungary and the share of species protected by national law. Source: Standovár & Primack (2001), Hungarian Ministry of Environment and Water (2009).*

Taxonomic group	Number of species detected in Hungary	Number of species protected by national law	% protected
Animals	43 560	997	2%
Plants	6 860	720	10%
Fungi	2 000-2 500	35	1-2%
Lichens	800	8	1%
Total	53 200-53 700	1 760	3%

The number of protected species has grown by 6% (from 1 660 to 1 760) since 2003. 36 plant, 91 bird and 105 other species listed on the European Union Habitats Directive occur in Hungary, some of them are protected by national law as well.

Next to the legal protection, the species action plans are also important regarding the long-term conservation of the populations of endangered species. Since 2004, action plans for 22 animal and 21 plant species were published by ministerial decree. These plans can be found on the website of the State Secretariat for Nature and Environment Protection (http://www.termeszetvedelem.hu/index.php?pg=menu_1555).

In the 2008 IUCN Red List of Threatened Species, 520 species occurring in Hungary have been evaluated regarding their global endangerment status. 17% of them were found being somehow endangered (categories critically endangered, endangered, vulnerable, near threatened, lower risk: conservation dependent) in the global level.

Country level red lists were compiled in 1989 for animal and plant species and in 2007 for vascular plant species (Table 4.). The proportion of vascular plants endangered at some level is 27,5%; numbers have grown by 30% between 1989 and 2007. 69% of these species are protected by national law.

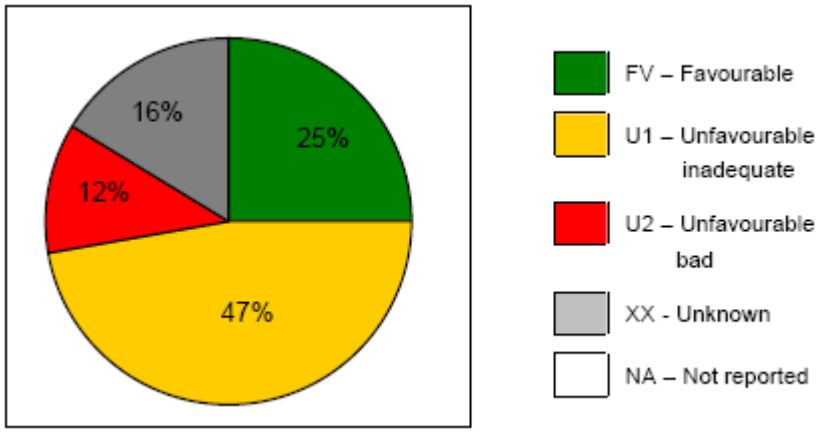
Table 4. *Number of threatened vascular plant species in Hungary according to Red lists compiled in 1989 and 2007. Source: Németh (1989) and Király (2007)*

Categories	Red list 1989	Red list 2007	Proportion of vascular flora	Changes 1989-2007
Extinct or disappeared	36	47	1,7%	31%
Critically endangered	41	115	4,1%	180%
Endangered	127	162	5,8%	28%
Potentially endangered	386	441	15,8%	14%

Not classified (data deficient)		178	6,4%	
Total		943	33,9%	
Total (except data deficient)	590	765	27,5%	30%

25% of the 211 species of European importance are in a favourable status, according to their monitoring between 2001 and 2006. Unfortunately, the status of another 59% is inadequate or bad (Figure 5.).

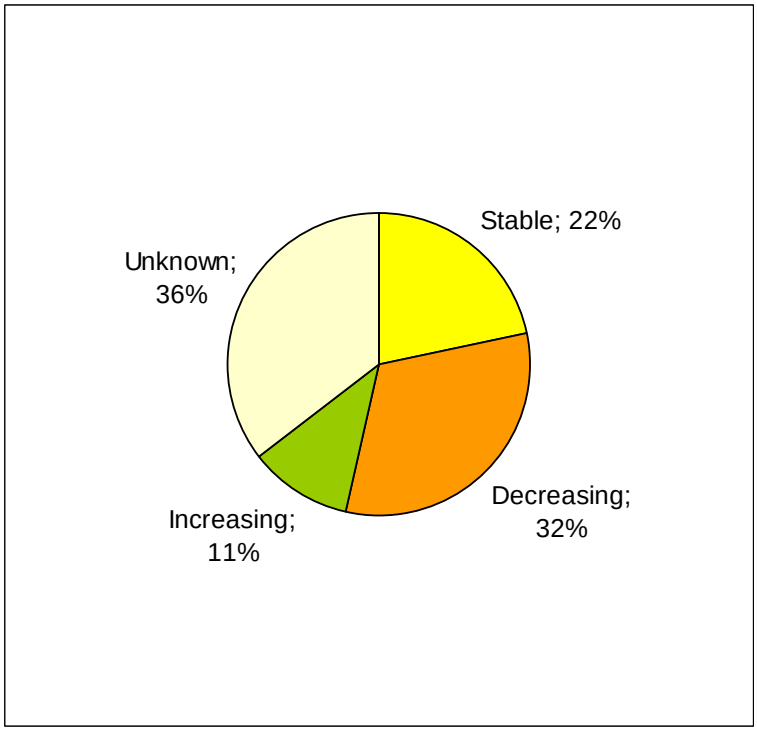
Figure 5. *Status of species protected by the European Union's Habitats Directive occurring in Hungary. Source: European Commission (2007).*



Trends

Populations of 211 animal and plant species of European importance are monitored regularly in Hungary by the Hungarian Biodiversity Monitoring System (HBMS), Ministry of Environment and Water. 11% of them are increasing, 22% are stable and 32% are decreasing (Figure 6.).

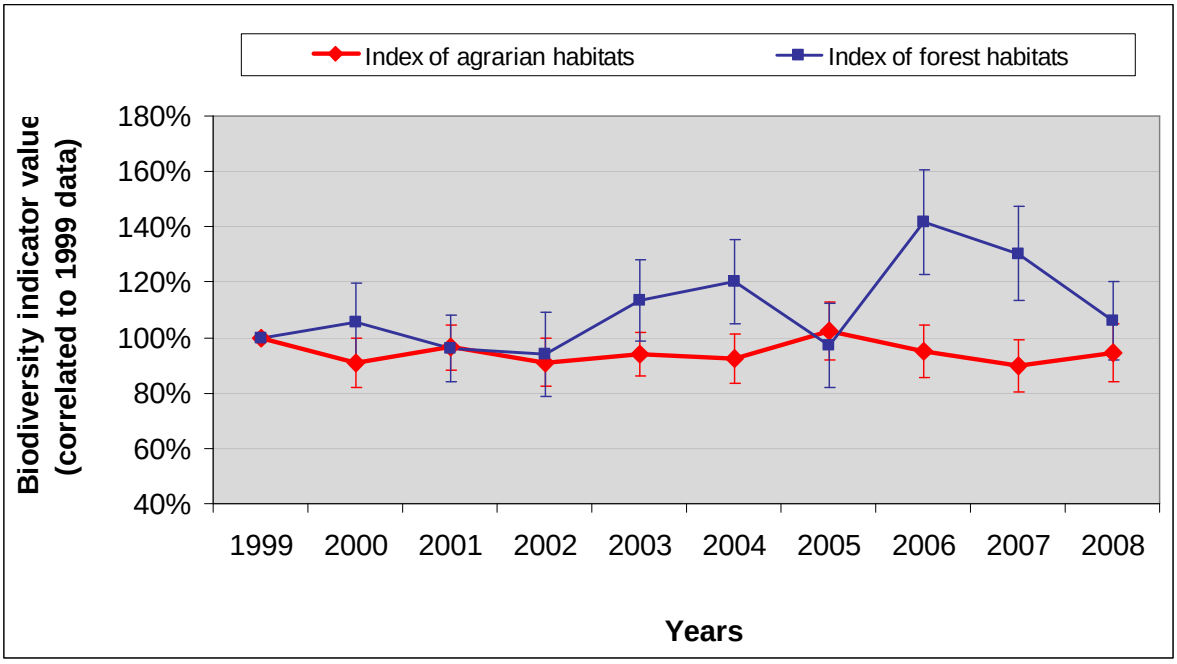
Figure 6. *Population trends of the 211 animal and plant of European importance monitored in Hungary. Source: Hungarian Biodiversity Monitoring System, Ministry of Environment and Water.*



Since a decade, the monitoring of common birds[1] is repeated every year on areas representing the main habitats of the country. The bird biodiversity indexes calculated from these surveys are thought to indicate the status and trends of the habitat's biodiversity. These indexes show that populations on agricultural habitats are stable (Figure 7.). Forest bird populations show great fluctuations, but with no apparent long-term trend (Figure 5.). Among the species population trends, those of long-distance migratory birds showed declining tendencies the most frequently, in contrast with more stable resident, partly and short term migratory species.

[1] Common birds of agricultural habitats: European kestrel (Falco tinnunculus), grey partridge (Perdix perdix), northern lapwing (Vanellus vanellus), turtle dove (Streptopelia turtur), hoopoe (Upupa epops), crested lark (Galerida cristata), skylark (Alauda arvensis), barn swallow (Hirundo rustica), tawny pipit, (Anthus campestris), meadow pipit (Anthus pratensis), yellow wagtail (Motacilla flava), whinchat (Saxicola rubetra), stonechat (Saxicola torquata rubicola), whitethroat (Sylvia communis), red-backed shrike (Lanius collurio), lesser grey shrike (Lanius minor), rook (Corvus frugilegus), tree sparrow (Passer montanus), serin (Serinus serinus), linnet (Carduelis cannabina), yellowhammer (Emberiza citrinella), corn bunting (Miliaria calandra).
Common birds of forest habitats: sparrowhawk (Accipiter nisus), stock dove (Columba oenas), black woodpecker (Dryocopus martius), middle spotted woodpecker (Dendrocopos medius), lesser spotted woodpecker (Dendrocopos minor), tree pipit (Anthus trivialis), redstart (Phoenicurus phoenicurus), wood warbler (Phylloscopus sibilatrix), chiffchaff (Pfylloscopus collybita), goldcrest (Regulus regulus), collared flycatcher (Ficedula albicollis), pied flycatcher (Ficedula hypoleuca), marsh tit (Parus palustris), willow tit (Parus montanus), nuthatch (Sitta europaea), short-toed treecreeper (Certhia brachydactyla), jay (Garrulus glandarius), hawfinch (Coccothraustes coccothraustes).

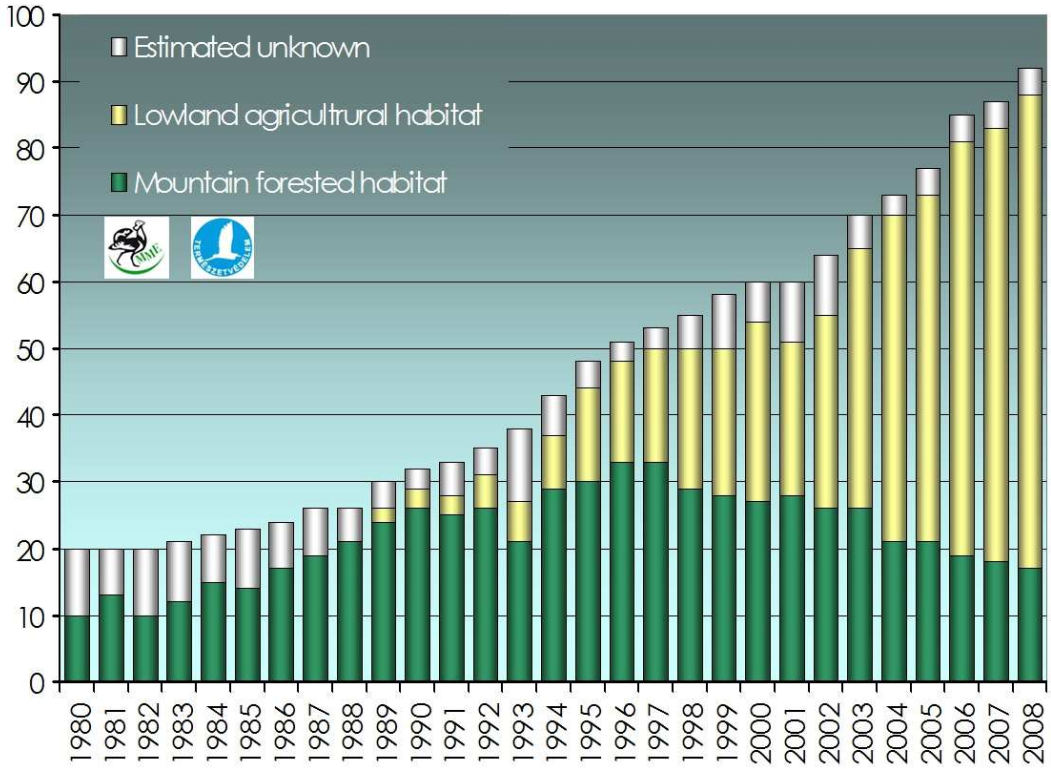
Figure 7. *Changes in the bird biodiversity index between 1999 and 2008 in Hungarian forest and agriculture habitats. Source: Szép & Nagy (2009).*



Significant decrease by more than 5% per annum has been detected in the case of 4 bird species, and significant yearly decrease of around 5% by 16 species. 4 species' populations showed an increase exceeding 5% per year, and that of 15 species an increase of around 5%.

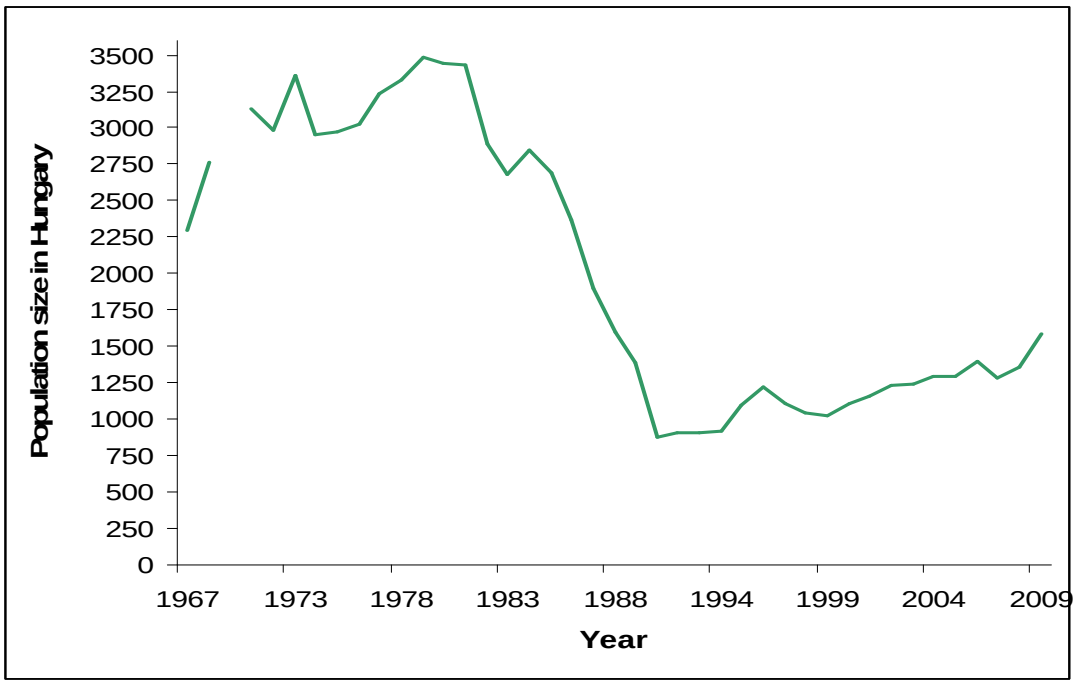
One of the flagship species of Hungarian conservation is the imperial eagle (*Aquila heliaca*). The distribution range of this eagle stretches from Central and South-Eastern Europe to Central Asia. Westward from Hungary and Slovakia only a few pairs occur in the Czech Republic and Eastern Austria. By the mid-20th century the Hungarian population had suffered a drastic decline due to the persecution of birds of prey. Conservation program has started to save the species, which comprised continuous guarding of endangered nests, handling of injured birds, reinforcement of collapsing nests, construction of artificial nests and other activities. An EU Life program was also carried out between 2002 and 2005. Due to effective conservation efforts, the population of 20 breeding pairs in the 1980s has shifted to more than 90 (Figure 8.), and is still growing. This is a remarkable success, since throughout most of the species' range populations are in decline.

Figure 8. *Population dynamics of the imperial eagle (Aquila heliaca) in Hungary between 1980 and 2008 (number of breeding pairs). Source: MME BirdLife Hungary.*



Another globally threatened flagship species is the great bustard (Otis tarda). Hungary holds its largest surviving population in Central Europe. The species got into a pitfall, because it has accommodated to human agricultural activities and resulting traditional agricultural landscapes. But the intensification of the production has brought new challenges: for example, many nests and chicks are destroyed by agricultural machines. Another threatening factor used to be hunting. At the turn of the 20th century, there were 10-12 thousand birds in Hungary, but by 1969 the population decreased to 2700. Since that year the species is strictly protected, with an allocated conservational value of 4 thousand Euros. In the mid 80s due to severe winters birds migrated to south and 1000 birds never returned, probably because of hunting. A LIFE program was carried out between 2004-2008. One of the main conservation activities in favour of bustards is nest protection – landowners are encouraged to protect nests discovered when mowing their grasslands. Eggs in peril are incubated artificially and repatriated afterwards. Other conservation measures include designation of protected areas, habitat improvement, land purchase, provision of food during winter, treating power lines to lessen collision danger and awareness-raising activities. As a result of the conservation efforts, the Hungarian population has almost doubled since the early 1990s (Figure 9.).

Figure 9. *Population dynamics of the great bustard (Otis tarda) in Hungary between 1967 and 2009. Source: Hungarian Great Bustard Expert Group.*



With regard to large carnivores, until 1995, the wolf was thought to be extinct in Hungary, and the lynx occurred only sporadically. Now both species have a permanent, but peripheral population in Hungary. Brown bear only occurs occasionally. Between 1998-2002, an EU Life program was carried out to fund the base of long-term large carnivore conservation in Hungary. Synchronised monitoring during the whole year has continued by relevant National Park Directorates since 2002. Monitoring data covering more than 10 years show that both species are present permanently in the country, mostly in the regions of Börzsöny, Bükk, Aggtelek and Zemplén. The estimated populations of both species are around a dozen individuals. Due to the vicinity of the Slovakian border, the Slovakian populations influence the size of the Hungarians. As the result of coordinated conservation efforts, wolfs are reproducing in the area of Aggtelek. Hungary and Slovakia has cross-border co-operation to preserve these species; including genetic studies.

As a part of the Hungarian Biodiversity Monitoring System (HBMS), small mammals are monitored based on owl pellet investigation. Data gathered between 2000-2005 proves that the composition of the small mammal fauna has not changed radically at the national level. However frequency values have shifted in the case of several species. Latter differences and the changes in distribution patterns of certain species are related with the changes in land use and in the structural elements of the landscape, with the alterations of distribution patterns in any species being greatly influenced by the migration and expansion potential of the species.

The strictly protected root vole (*Microtus oeconomus*), the rarest vole species in Hungary has received special attention in the monitoring system. Based on the population-level monitoring it is known that the root vole has only three isolated populations in the territory of Kis-Balaton, Szigetköz and Tóköz-Hanság, all in Transdanubia. Monitoring has demonstrated a gradation peak and later decrease in Szigetköz and Tóköz-Hanság, while at Kis-Balaton, after human interventions in 2001 the species could not be found any more. In the last decades

large scale water management activities further fragmented or even destroyed suitable patches on these important habitats.

Populations of European ground squirrels are monitored separately as well. The results are presented in the below 'Grasslands' section.

Data collected at 25 sites by the forestry light trap network have produced long-term time series of Macrolepidopteran assemblages for over four decades (1962-2004). Data coming from 16 sites have been used by the HBMS to assess biodiversity trends. The trapping sites are scattered in highland and lowland regions surrounded by various types of forest (e.g. oak, beech, mixed forests, or poplar), and habitats (e.g. dry grasslands, wet meadows). During the last four decades statistically significant decreasing trends were detected in time series of species richness and species diversity in six and ten sites, respectively. In these cases the moth assemblages declined yearly with 2.6-4.0 species in average. Only two assemblages showed significantly increasing trend of long-term species richness and diversity patterns. The total yearly number of individuals was characterised by negative slope of trend in two cases, and rising trend in four sites. In most cases the time series patterns of abundance and species diversity fluctuated synchronously between sites reflecting to influences of common, spatially extended environmental factors like year-to-year changes in climatic conditions.

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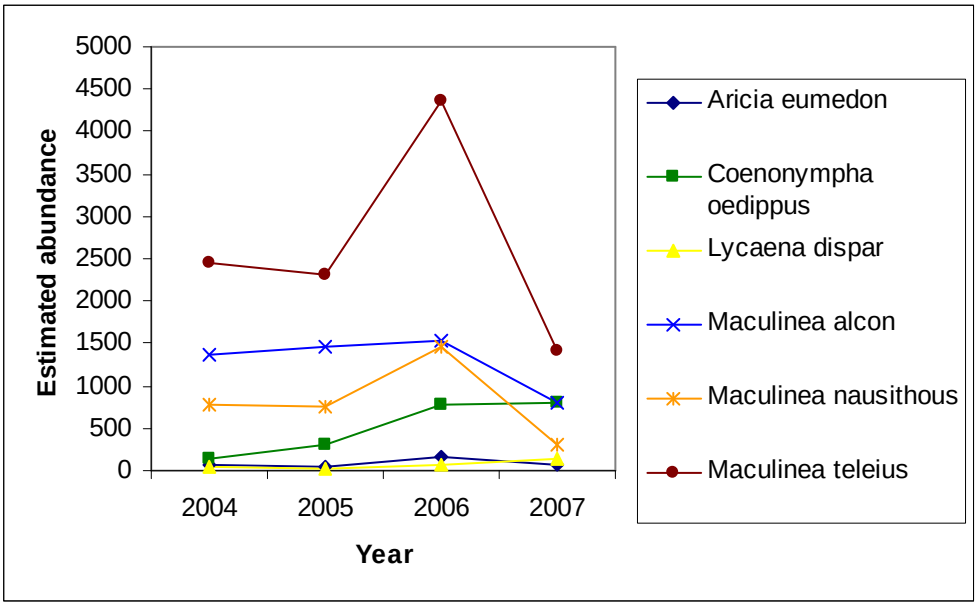
Six butterfly species (*Aricia eumedon, Coenonymphya oedippus, Lycaena dispar* and three *Maculinea* species) are monitored since 2004 at several humid habitats in Hungary. The resulting population trends can be seen on Figure 10. Because of the large oscillation in abundance, long term trends can not be seen at the moment. But these data are already valuable for conservation management.

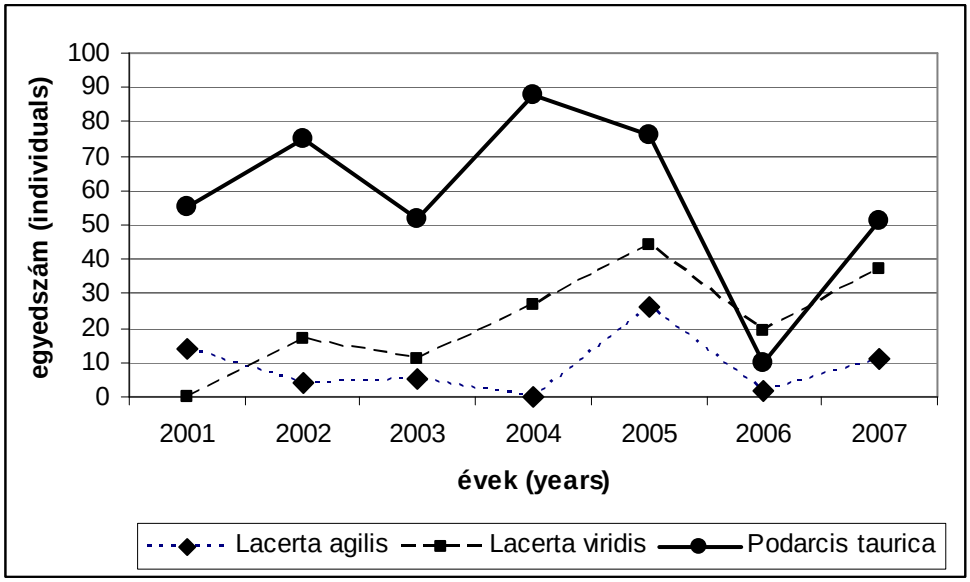
Figure 10. *Aggregated population dynamics of six butterfly species at Hungarian monitoring sites between 2004 and 2007. Source: Hungarian Biodiversity Monitoring System, Ministry of Environment and Water.*



Reptile and amphibian communities have been monitored since 2001 in the frame of the HBMS in six regions of Hungary: Pilis-Visegrád Mountains, Ócsa Nature Reserve, Gödöllő Hills, Aggtelek-Jósvafő and White Lake near Kardoskút (the latter since 2005).

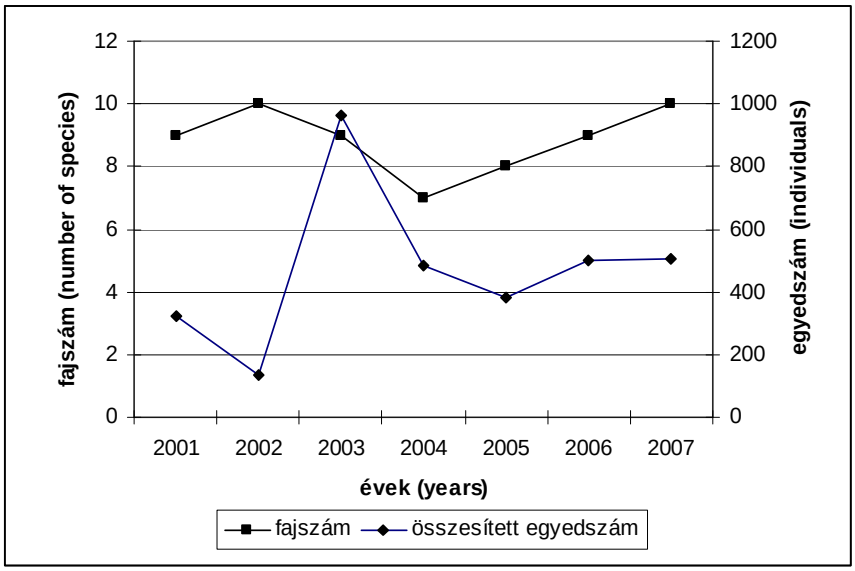
As an example, data is provided on a sand steppe near Ócsa, where three species of lizards occur: the sand lizard *(Lacerta agilis)*, the European green lizard *(L. viridis)* and the Balkan wall lizard *(Podarcis taurica)*. Disturbance connected to the cut of a neighbouring forest belt in winter 2005 and spring 2006 resulted in a considerable decline of lizards' sightings, but in 2007 numbers grew again (Figure 11.).

Figure 11. *Change in the number of individuals of coexisting lizard species of the site Ócsa Kiskőrös-alja between 2001-2007. Source: Kiss et al. (In press).*



For amphibians, as an example, the results of the monitoring at Lake Vörös in the karst of Aggtelek are presented. Changes in amphibian species number and abundance are mainly the results of the increase of free water surface and deepness due to a dredging of the lake in winter 2001/2002 (Figure 12.).

Figure 12. *Changes in the number of species and individuals of the most abundant amphibian species of Lake Vörös in the karst of Aggtelek between 2001-2007. Source: Kiss et al. (In press).*

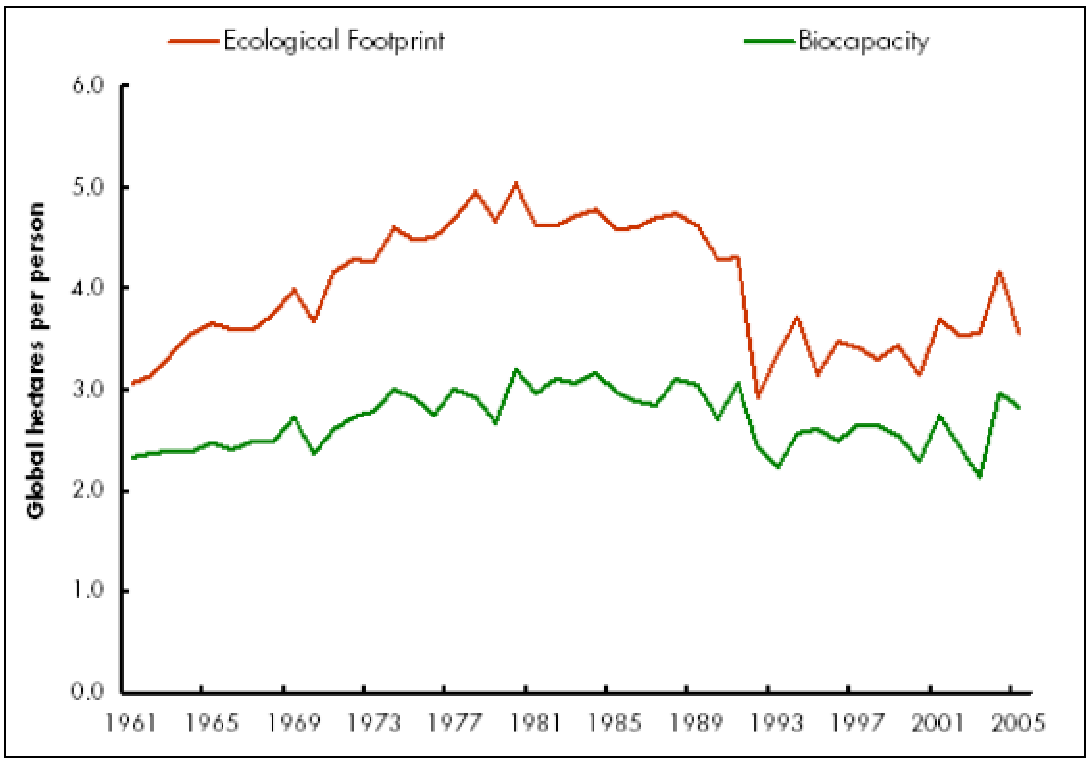


Main threats to biodiversity

General trends of economic development and pressures on ecosystems

Most of the threats to biodiversity arise from human activities. Ecological footprint is a possibility to measure overall human pressure on nature as it shows how much land and water area a human population requires to produce the resource it consumes and to absorb its wastes, using prevailing technology. According to The Ecological Footprint Atlas, Hungary's per capita ecological footprint was 3.5 global hectares in 2005. As the corresponding biocapacity was only 2.8 hectares, the country had an ecological deficit of 0.7 hectares. (In comparison: the world total ecological footprint per capita was 2.7, while the biocapacity was 2.1). This means that the country's population is putting more pressure on the ecosystems than the sustainable level, which affects biodiversity. Due to imported goods, these effects can partly be observed in other countries. Between 1989 and 1993, with the collapse of socialist regime and economy, Hungary's footprint has substantially decreased (from 4.5- 5 ha to 3-3.5 ha), and since it is oscillating around 3.5 (Figure 13.). This is happening in spite of a marked overall economic growth during the last 15 years.

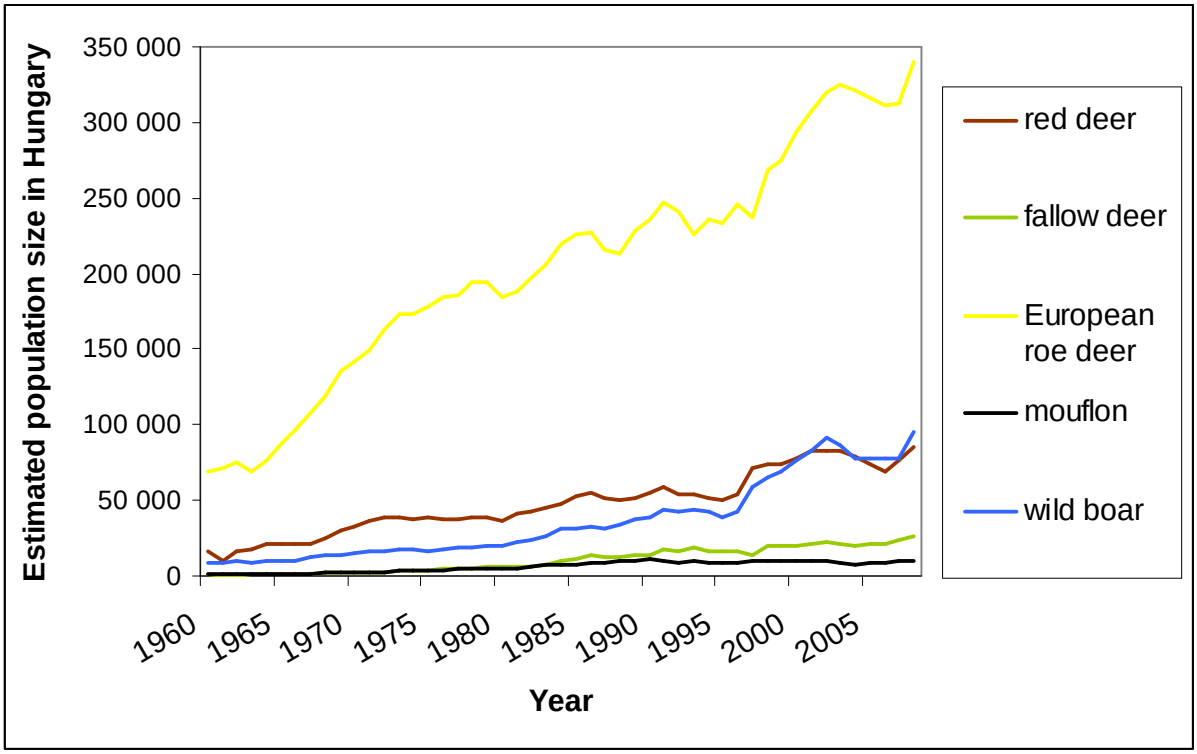
Figure 13.: *Average per person resource demand (Ecological Footprint) and per person resource supply (Biocapacity) in Hungary since 1961. Biocapacity varies each year with ecosystem management, agricultural practices (such as fertilizer use and irrigation), ecosystem degradation and weather. Source: /www.footprintnetwork.org*



Growing demand for consumer goods, changes in consumption patterns, motorisation, further development of infrastructure etc. has both direct and indirect effects on biodiversity, the landscape structure and the utilisation of natural resources.

Threats to biodiversity can be quite diverse when considering them in more detail. During the above-mentioned Landscape Ecological Vegetation Mapping of Hungary (MÉTA) 28 factors threatening plant biodiversity in Hungary were determined. The most important among them are the following: invasive alien species, game populations kept in too high levels at certain areas (Figure 14.), drainage, development of secondary shrub habitats after disturbance or abandonment, trampling, large-scale intensive forest management, and abandoning the mowing and grazing of grasslands.

Figure 14. *Estimated population size of mammalian game species in Hungary: red deer (Cervus elaphus), fallow deer (Dama dama), European roe deer (Capreolus capreolus), mouflon (Ovis orientalis orientalis), wild boar (Sus scrofa). Data on brown hare are presented on Figure 20. Source: Hungarian Game Management Database (2006), Csányi et al. (2006, 2007 and 2008).*



Invasion of alien species

The HBMS monitors 5 invasive plant species (*Ailanthus altissima, Amorpha fruticosa, Asclepias syriaca, Solidago gigantea, Solidago canadensis*) at the landscape, community and population levels since 1998. The distribution and impact of invasive alien species on natural vegetation of the whole area of Hungary were evaluated during the MÉTA vegetation survey conducted between 2003-2006. The results indicate that 5.5 percent of the country is covered by perennial alien species. This number is only slightly lower than the half of the total area of natural vegetation; with the inclusion of alien annuals in the arable fields and alien plantations included, this number would be much higher. The outcome of the survey suggests that the most invaded region is the Kisalföld, where in the floodplains of the Danube and Rába rivers, and in the large dried out marsh and fen areas of the Hanság region huge stands of certain alien species have developed. Medium mountain area with high percentage of (semi)natural forest cover are the less invaded. The most important alien plant species are *Acer negundo, Ailanthus altissima, Amorpha fruticosa, Asclepias syriaca, Elaeagnus angustifolia, Fraxinus pennsylvanica, Robinia pseudo-acacia and Solidago spp.*

Fragmentation

The economic model and path prevailing in Hungary since the mid-1990s has resulted in a rapidly growing demand for land for development. Lands have been withdrawn from cultivation for the purposes of residential construction, green-field investment for shopping centres, highways, industrial parks. Further development of infrastructure (especially linear facilities) may increase the fragmentation of the spatial structure of the landscape and may

lead to a decline of natural areas, fragmentation of habitats, and the isolation of natural populations. The rapid adaptation to western style consumerism has wide ranging implications on biodiversity.

Climate change

The effects of climate change are already appearing in Hungary. According to the calendar kept by beekeepers since 150 years, Black Locust trees are flowering 3-8 days earlier than in the 19th century. Bird migration times are changing and some previously migrant birds stay in the country in mild winters. New, thermophile plant species coming from south have appeared in the country – some of them are invasive. According to data provided by the forestry light trap network, new moth species are arriving from south and the abundance of humidity-loving species is decreasing.

In forests, the accumulation of years of drought increases tree-dying and damages caused by insects. Abundances of previously insignificant species may undergo a dramatic increase so that these insects become strong pests. This is due to two reasons: the decrease in resistance potential of trees because of drought and the advantageous temperature favouring the gradation of pests. Effects of climate change interact with those of forest management.

Natural vulnerability of Hungary

Hungary is situated in the centre of the Carpathian basin, which has dual consequences for its conservation potentials. Firstly, Hungary's entire territory is situated in the Pannonian biogeographical region which is characterised by a wide range of special biological conditions, such as the presence of a number of endemic species and habitat types. The deliberate or accidental introduction of non-native species in Hungary therefore carries a particular hazard. Secondly, Hungary is particularly exposed to negative trans-boundary environmental impacts due to the geographical characteristics of the basin, for example it receives 95% of its surface water from abroad.

Case-study: Sub-national follow-up to the Millennium Ecosystem Assessment

Kiskunság covers 7300 km^2 in the Danube-Tisza Interfluve in central Hungary. Ecological research in the Kiskunság, a highly heterogeneous cultural landscape, has been going on for four decades, but studies typically focused on a single habitat. In the past few years the KISKUN LTER program systematically expanded into a broad-scale research framework. The program is carried out by the Institute for Ecology and Botany of the Hungarian Academy of Sciences in collaboration with leading Hungarian research centres in botany, zoology, soil science and agro-environmental research.

The program can be considered as a sub-national follow-up to the Millennium Ecosystem Assessment (MA). Its overall objective is to assess the relationships between land-use, biodiversity and ecosystem functioning in this highly heterogeneous landscape under changing environmental and socio-economic conditions. By providing insight into ecological processes for policy-makers and land-manager, the project aimed at contributing to an ecologically sustainable land-use in the region. The major research directions include the

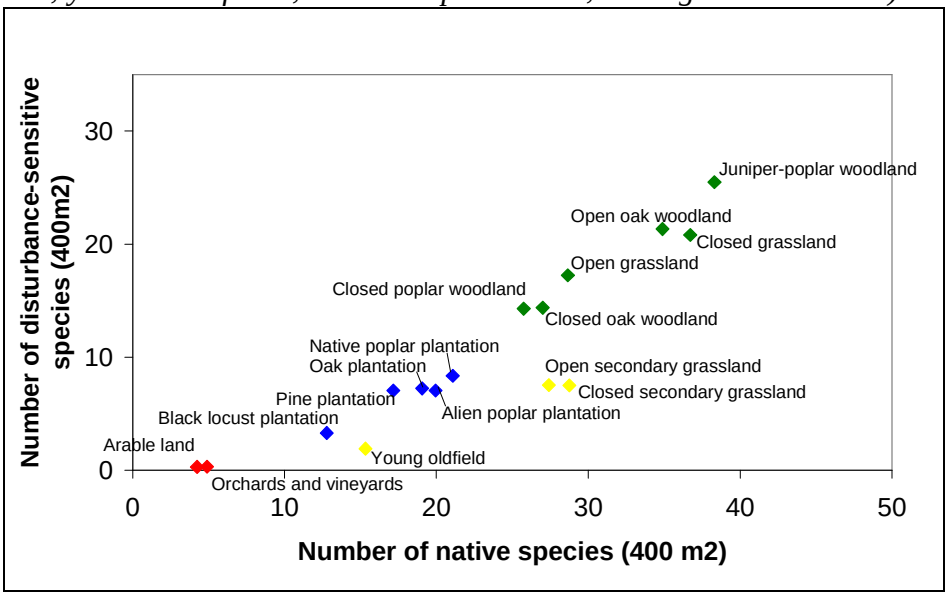
following, often related or even overlapping topics: (1) the survival of remnant natural ecosystems, (2) biological invasion, (3) oldfield succession, (4) afforestation, and (5) ecosystem services. Some outcomes are summarised below.

Plant diversity across all major habitat0 types occurring in the region

Land-use is clearly one of the most important factors affecting biodiversity in this area. The objective of the project was to compare the herbaceous plant diversity of all major habitat types occurring in the landscape mosaics of the region.

Juniper-poplar woodland, open oak woodland, and closed grassland were found to be the most diverse; the first two of these represent the transitional forest steppe vegetation type, with inherent heterogeneity in microhabitats (Figure 15.). Among tree plantations, black locust plantations are the poorest in species, whereas the others, including both native and alien tree plantations have a similar diversity. All tree plantations, however, contain fewer native species than secondary grasslands (old oldfields), suggesting that setting aside abandoned lands, which is an alternative to afforestation, can boost biodiversity.

Figure 15. *Number of native species and the number of disturbance-sensitive (high conservation value) species in different land-use and associated habitat types. (green: natural habitats; yellow: old-fields; blue: tree plantations, red: agrarian habitats).*



An opportunity for biodiversity: land abandonment and natural regeneration potential of abandoned agricultural lands

Through spontaneous succession, abandoned lands can develop into high conservation value habitats, if natural ecosystems (propagule sources) are available nearby. The extent of arable land is decreasing in the Kiskunság. Conversion of these lands into alien tree plantations have accelerated in the past few years, without taking into consideration their spatial location and regeneration potential.

Field studies in the Kiskunság demonstrated that abandoned agricultural lands can develop into semi-natural secondary habitats within a few decades.

Areas with high regeneration potential make up 40% of arable land on coarse-textured sand, and are scattered over large areas within the region due to the present interspersion of agricultural areas and natural vegetation fragments. Subregions and municipalities with highest proportion of such areas have the highest potential for valuable secondary ecosystems in the future if arable lands are abandoned.

Local valuation of ecosystem services, implications of changes on human well-being

A joint research by economists, sociologists, and ecologists was conducted in order to understand what local people in the Kiskunság region consider the most important ecosystem services (ESs) for the well-being of their community. In four villages in central Kiskunság, 55 semi-structured interviews were conducted in 2007, and two focus group and one stakeholder workshops were organised in 2008. Interviews resulted in a detailed inventory of local ESs, and a list of conflicts over land use was compiled. Crucial actors and driving forces affecting the flows of ESs were identified in the focus group discussions.

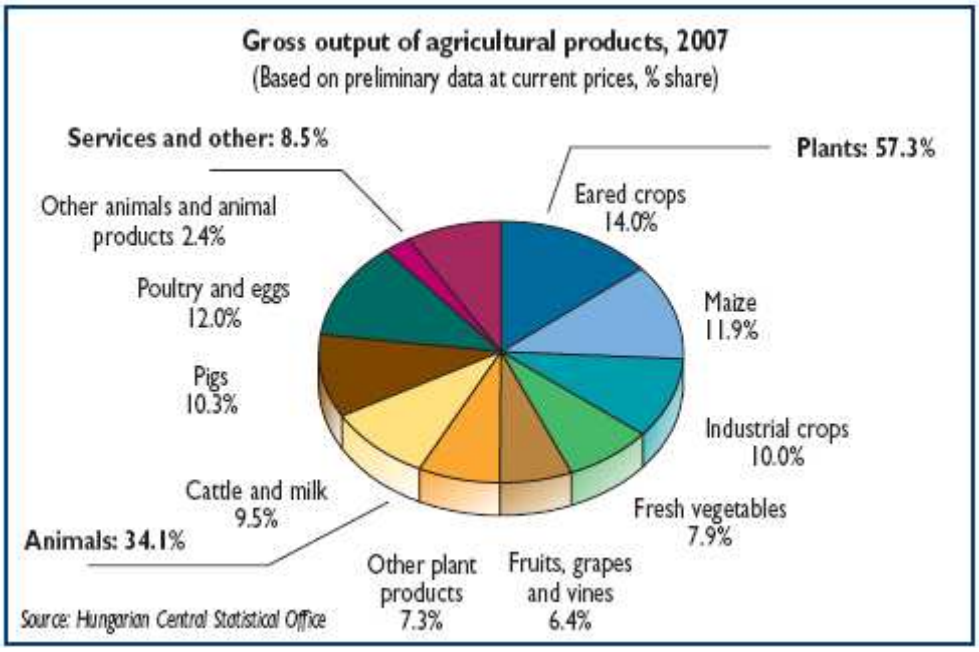
Most important services identified by participants were (1) water regulation, (2) animal husbandry, (3) biodiversity (sand dunes and the harmony of nature protection and agriculture), and (4) cultural heritage (traditional homesteads and viniculture). The analysis revealed why people prefer a particular service to others (e.g. water regulation is the basis of the well-being of the community, as if water is provided, animal husbandry is viable, and hence eco-tourism can add extra value to farming). Biodiversity was ranked the second most important ES for the local community's well being on stakeholder workshops, and was considered to be related to traditional farming practices with mainly aesthetic values.

II. Biomes, habitats and ecosystems

Agricultural ecosystems

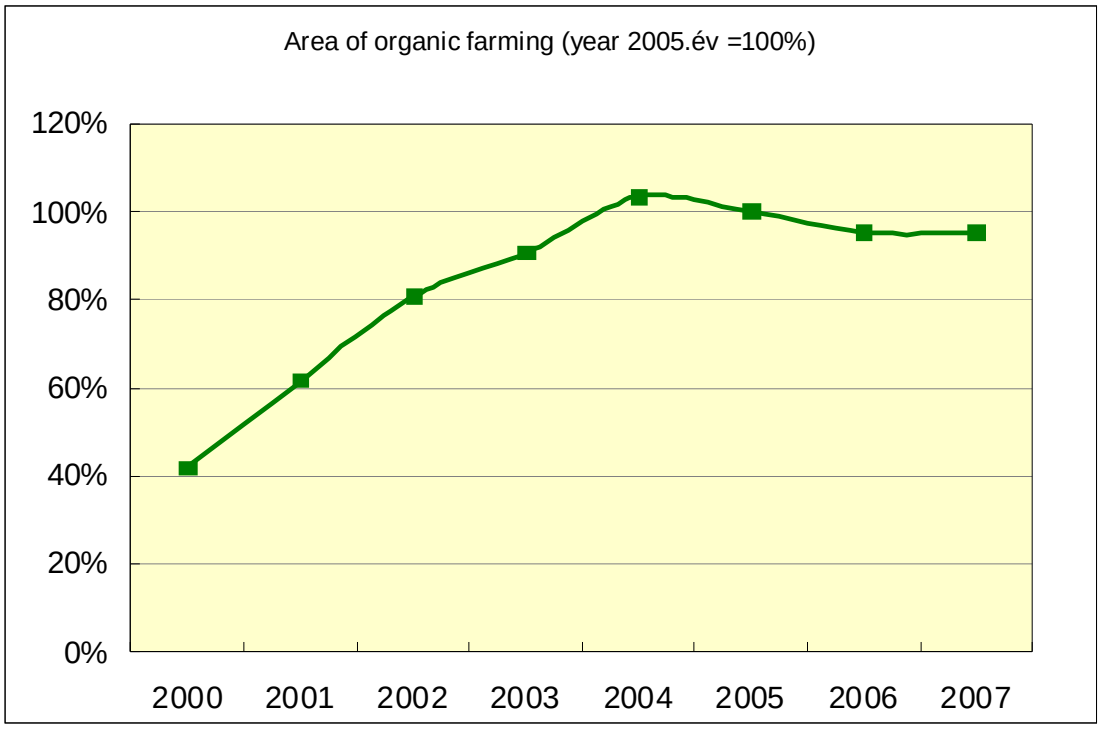
Agriculture is one of the most determinative sectors of the Hungarian national economy. The unique natural endowments of the country's topography, climatic conditions and highly fertile soils make it possible to achieve yields of outstanding quality and quantity in most crops. Hungary has a total area of 9.3 million hectares. 83% (7 721 000 ha) of Hungary is cultivable land, including forests, reed-beds and fishponds. The total agricultural area is 5,807,000 hectares (62,4%), which represents an outstandingly high proportion in Europe. 78% of this agricultural area is made up of arable land and 17% is grassland, while kitchen gardens, orchards and vineyards account for 5%. More than half of the production involves plants, 34% animals and 8.5% services and others (Figure 16.)

Figure 16. *Share of different agricultural products in the Hungarian production.*



The area of organic farming – where chemicals are not used – more than doubled between 2000 and 2004, but since then numbers are stagnating (Figure 17.). In 2007, ecological production covered 122,270 hectares (1.3% of Hungary's territory).

Figure 17. *Change the area of organic farming in Hungary. Source: Hungarian Ministry of Environment and Water (2009).*



Besides the declining trends of the area occupied by natural vegetation, some attention should be directed towards plough-lands freed from cultivation, where vegetation can start to regenerate. In 2006, there were about 350,000 ha of uncultivated land of 2-50 years of age in Hungary. In 2007 and 2008, this number has diminished because of the increase of food prices and changes in European Union regulation.

Overview of status of biodiversity

Hungary is rich in native plant genetic resources as its territory belongs to a secondary centre of crop diversity, where a number of local types and landraces developed even in relatively recently introduced New World crops (green and red peppers, tomato, maize etc.). The natural flora is an especially rich source of wild fruits, medicinal plants (including diverse chemotaxa), forage grasses and legumes, and some crop wild relatives (*Aegilops, Lactuca, Daucus, Secale, Vitis, Prunus, Pyrus* etc.).

A great variation of local types of temperate fruits and grapes are still grown in so called "restricted garden areas", and backyards. In the Eastern part of the country, semi-natural fruit forests (walnut, plum) still exist and maintained in protected areas.

In situ conservation of crop wild relatives and landraces is closely associated with nature conservation. Populations of several crop wild relatives live in protected natural habitats, and such areas can also play an important role in “in situ, on farm” conservation of locally developed landraces. Although the main aim of the Ramsar convention is the protection of wetlands (as birds-habitats) a number of protected plants including crop wild relatives live in these areas (Table 4).

Table 4: *List of protected crop wild relatives occurring in Ramsar sites.*
Source: Hungarian Ministry of Agriculture and Rural Development (2008)

Aster tripolium pannonicus	*Limonium gmelini*
Butomus umbellatus	*Nuphar luteum*
Carpesium abrotanoides	*Nymphaea alba*
Cirsium brachycephalum	*Nymphoides peltata*
Crataegus nigra	*Ophrys sphegodes*
Dryopteris carthusiana	*Orchis palustris*
Eriophorum ssp.	*Orchis purpurea*
Gentiana pneumonanthe	*Plantago schwarzenbergiana*
Iris pseudacorus	*Puccinellia distans*
Iris sibirica	*Puccinellia peisonis*
Iris spuria	*Sagittaria sagittifolia*
Lepidium crassifolium	*Suaeda pannonica*
Leucanthemella serotina	*Trapa natans*
Leucanthemum serotinum	*Urtica kioviensis*
Leucojum aestivum	*Utricularia vulgaris*

The ex situ collection of seed-propagated plant genetic resources contains 86,756 accessions of 1,877 taxa maintained under medium and long term chambers (Figure 18.) at

the Research Centre for Agrobotany at Tápiószele (RCAT). The number of accessions in the Active collection increased from 46,489 to 75,598 between 1996 and 2007. The number of accessions in the Base collection (from 7,840 to 11,158) and the number of taxa (from 1,290 to 1,877) have increased, too.

Figure 18: *Increase of taxa and accessions of seed-propagated species at Research Centre for Agrobotany (RCAT), 1996-2007. Source: Hungarian Ministry of Agriculture and Rural Development (2008).*

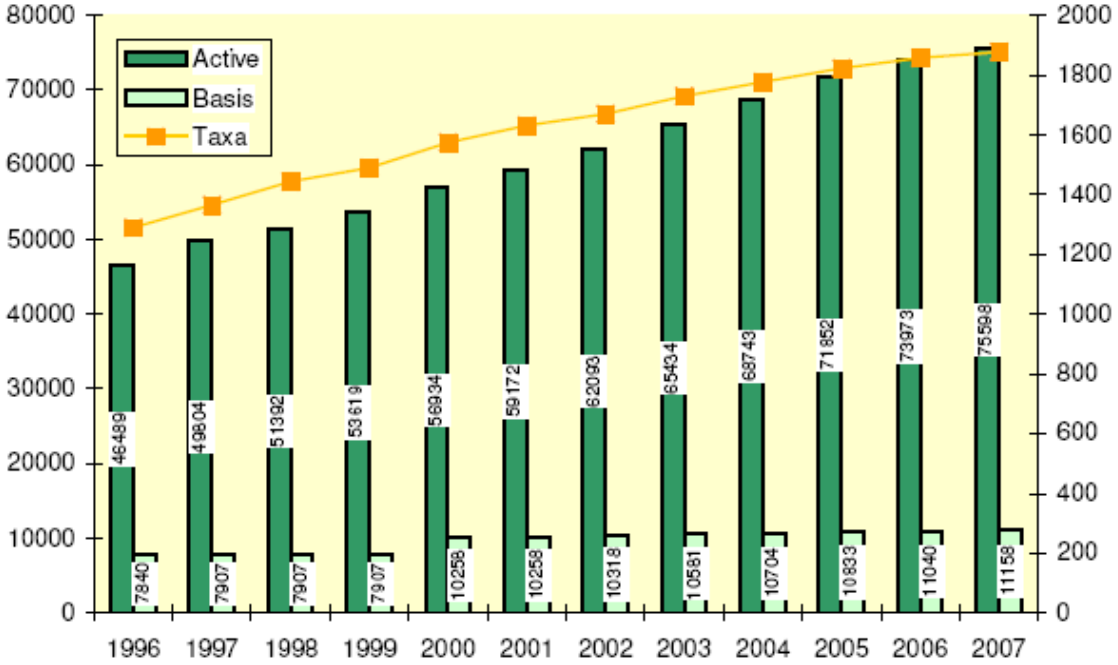


Table 5 shows the number of genebank collections and their contribution to the Hungarian National Inventory according to the latest assessment of the national genebank activities. According to these data, 90 institutions are involved in the conservation of approximately 150,000 accessions of plant and micro-organism genetic resources.

Table 5: *The number of institutions holding plant genetic resources collections and their contributions to the National Inventory. Source: Hungarian Ministry of Agriculture and Rural Development (2008): Second country report concerning the state of plant genetic resources for food and agriculture.*

Crop groups	1996			2003		
	No of institution.	No of accession	RCA	No of institution*	No of accession*	RCA**
fruits				12	8,067	
grape	11	4,316		11	4,758	
field crops	14	52,988	37,246	12	89,716	69,582
medicinal plants				5	4,789	1,235
micro-				9	2,890	

organisms						
ornamentals				22	10,392	282
vegetables	14	15,866	8,587	9	23,728	16,274
Sum total:	39	73,170	45,833	90	144,340	87,373

*RCA included

In Hungary, the law on animal breeding regulates the conservation of native and endangered domestic animal breeds and considers this task as a state responsibility. At present 46 breeds are found in the list of native domestic animal breeds of national importance (Table 7.) and the list must be updated every five years.

Table 7.: *Domestic animal breeds in Hungary.*
Source: Hungarian Ministry of Agriculture and Rural Development

Species	Most common name (local breeds)	Current status	Changes in the number of female breeding animals		Total number of breeds*
			2003	2009	
Cattle					14
	Bonyhadi	Extinct		0	
	Hungarian Brown	Extinct		0	
	Dairy Hungarian brown	Extinct		0	
	Diary Hungarian simmental	Extinct			
	Hungarian grey cattle	Endangered-Maintained	5 200	7 500	
	Hungarian simmental	Endangered		5 500	
Buffaloo					
	Hungarian domestic buffaloo	Endangered-Maintained	349 (in 2005)	400	1
Pig					11
	Ancient Alföldi	Extinct		0	
	Bakonyi	Extinct		0	
	Szalontai	Extinct		0	
	Mangalitsa Blond	Endangered-Maintained	2 150	6 730	
	Mangalitsa Swallow Bellied	Endangered-Maintained	400	880	
	Mangalitsa Red	Endangered-Maintained	550	1 450	
Chicken					38
	Gödöllõi New Hampshire	Critical-Maintained			
	White Transylvanian bald-necked hen	Endangered-Maintained	338	1 015	
	Black Transylvanian bald-necked hen	Endangered-Maintained	234		
	Speckled Transylvanian bald-necked hen	Endangered-Maintained	738		
	Yellow Hungarian hen	Endangered-Maintained	1 900	2 169	

	White Hungarian hen	Endangered-Maintained	500	391	
	Speckled Hungarian hen	Endangered-Maintained	1 600	949	
	Partridge coloured Hungarian hen	Endangered-Maintained	322 (in 2005)	423	
Sheep					19
	Cikta	Endangered-Maintained	400	550	
	Cigaja	Endangered-Maintained	1 800	8 420	
	Hortobágyi racka white	Endangered-Maintained	3 240	9 450	
	Hortobágyi racka black	Endangered-Maintained	2 160	5 000	
	Gyimesi racka	Endangered-Maintained	1 600	7 450	
Goose (domestic)					23
	Ruffled-feathered hungarian goose	Endangered-Maintained	600	406	
	Hungarian goose	Endangered-Maintained	246 (in 2006)	286	
Guineafoul					
	Hungarian helmeted guineafoul	Endangered-Maintained	227	423	
Duck					12
	Coloured Hungarian duck	Endangered-Maintained	393 (in 2005)	211	
	White Hungarian duck	Endangered-Maintained	148 (in 2005)		
Turkey					10
	Bronze-feathered turkey	Endangered-Maintained	300	216	
	Brown-feathered turkey	Endangered-Maintained	200	195	
Horse					25
	Furioso-North Star	Endangered	614	600	
	Gidran	Endangered	150	280	
	Hucul	Endangered	104	100	
	Kisbéri félvér	Endangered	1 198	960	
	Lipizzan	Endangered	521	1 025	
	Nonius	Endangered	627	700	
	Shagya arabian	Endangered	442	670	
	Hungarian cold-blooded horse	Endangered-Maintained		920	
	Pinkafő	Extinct		0	
Donkey					1
	Hungarian parlagi dokey	Endangered-Maintained	49 (in 2005)	150	
Goat					8
	Hungarian goat	Endangered-Maintained		?	
Rabbit					9
	Hungarian giant rabbit	Endangered-Maintained		50	

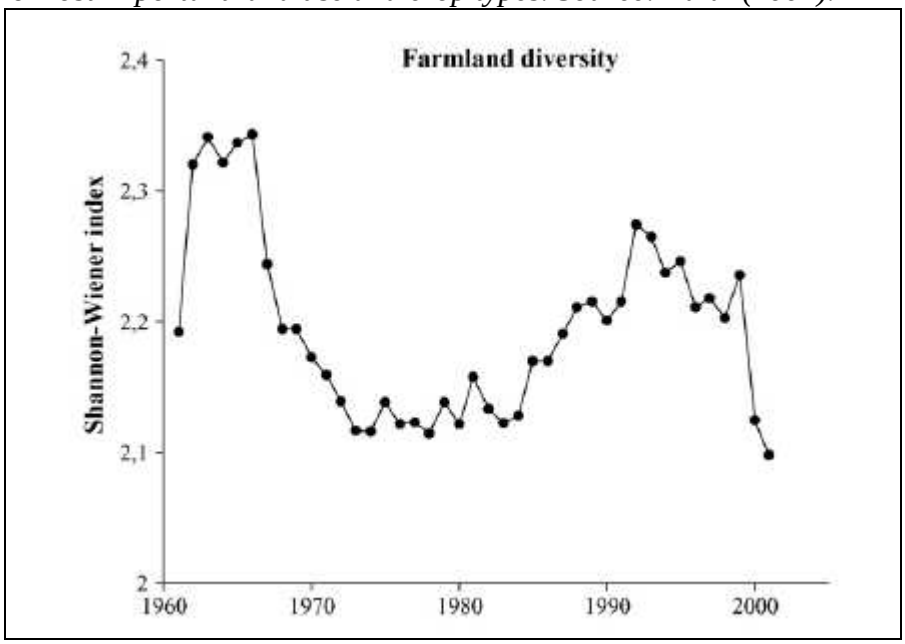
Fish					32
	Two forms of carp	Endangered			

*Breeds recorded by the Central Agricultural Office: recognized, provisionally recognized and declared breeds.

Trends

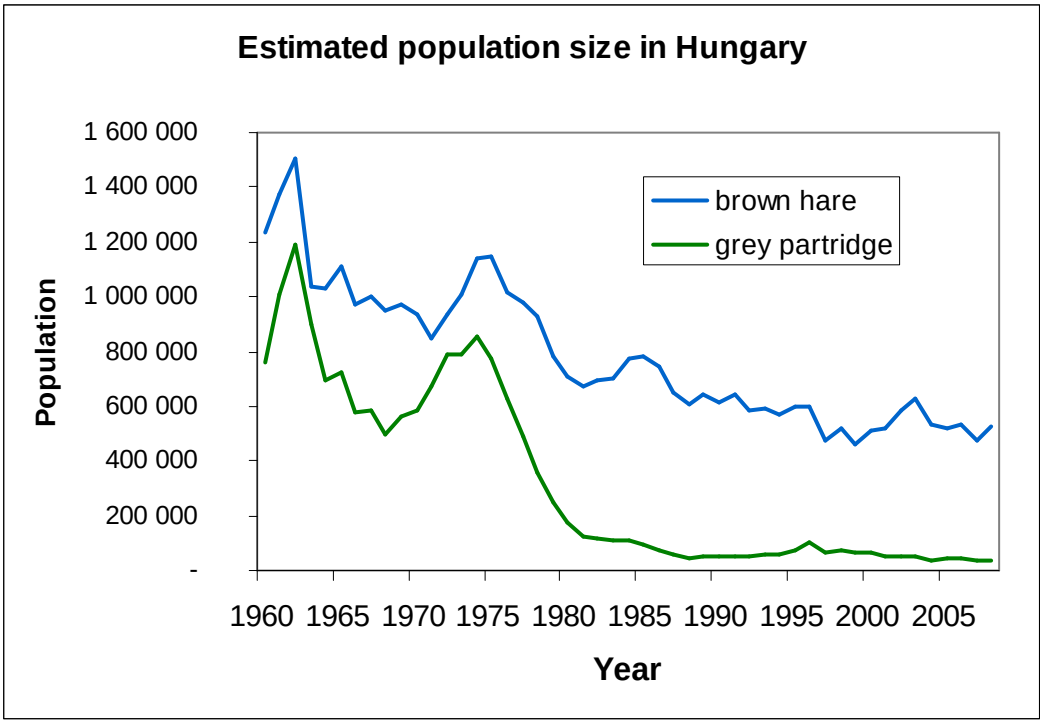
Figure 19. shows the change of farmland diversity in Hungary, calculated by applying the Shannon–Wiener diversity measure to landscape composition, using the area of the 16 most important land cover types (grassland, lands withdrawn from cultivation) and crop types (wheat, maize, barley, rye, oat, potato, sunflower, sugar beet, alfalfa, fibre crops, fruits, pulses, vegetables, abandoned land).

Figure 19. *Changes in the diversity of Hungarian farmlands between 1961–2001, based on the 16 most important land use and crop types. Source: Báldi (2007).*



The brown hare (*Lepus europaeus*) population in Hungary halved between 1960 and 2001, while grey partridge (*Perdix perdix*) abundance showed a more than 10-fold decline. The decrease is less dramatic since the early 1980s (Figure 20.). Changes in abundance of agricultural birds in the last decade can be seen on Figure 5.

Figure 20. *Changes in the total estimated population size of grey partridge (Perdix perdix) and brown hare (Lepus europaeus) in Hungary between 1961 and 2008. Source: Hungarian Game Management Database (2006), Csányi et al. (2006, 2007 and 2008).*



A study demonstrated a strong negative correlation between the abundance of brown hare and grey partridge and measures of intensification (yields, machinery), and a positive correlation with cattle density. There were no significant correlations for either fertiliser consumption or farmland diversity.

The change of regime and joining the EU has resulted in drastic changes in land use. Many arable lands and other agricultural areas were abandoned, the over-grazing stopped, and the intensity of agriculture – e.g. the use of chemicals – decreased. These changes favoured the biodiversity of agricultural lands; however traditional land-use forms have been disappearing.

An agri-environmental programme was started, which subsidies extra performance associated with environmentally-aware farming, sustainable landscape management and animal welfare investments, and reimburse income losses resulting from these activities. The programme allows only a limited level of chemical use in participating sites. The real impact on biodiversity of the programme is not assessed yet.

Considerable changes occurred in the state of diversity of the country's agricultural production system between 1996 and 2007 (Table 6). Comparing the relevant issues of the national list for cultivars published in 1996 and 2007 it turns out that in spite of a slight decrease of taxa the number of registered cultivars has almost doubled. In case of field crops, forest plants, fruits, grape vine the increases in the number of varieties are 110.8%, 35.7%, 76.6%, 91.8%, 72.1%, respectively. Although the number of taxa has slightly declined in the cases of ornamentals and vegetables, the number of registered varieties has increased in these crop groups as well. The remarkable change in case of vegetables is representing the highest increase among the crop groups (312%).

Table 6: *Changes in the number of registered taxa and cultivars in Hungary*

Source: Hungarian Ministry of Agriculture and Rural Development (2008): Second country report concerning the state of plant genetic resources for food and agriculture

	1996		2007	
Crops	**Taxa**	**Varieties**	**Taxa**	**Varieties**
field crops	73	761	85	1,604
forest plants	11	28	11	38
fruit	21	252	33	445
grape vine	1	97	1	186
medicinal plants, herbs, spice and volatile oil crops	28	43	36	74
mushroom			7	12
ornamentals	149	393	83	451
vegetables	51	434	48	1,792
Total:	**334**	**2,008**	**304**	**4,602**

Trends of the Hungarian great bustard population, living mainly in agricultural areas are presented in the “Trends” section of the “General overview” chapter.

Main threats to biodiversity

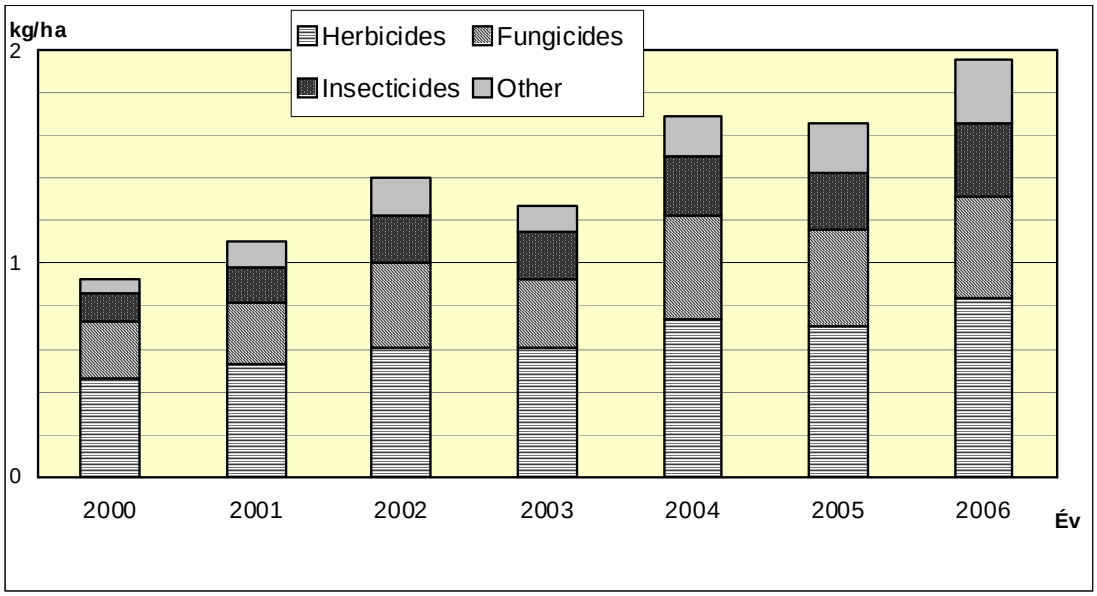
Cheap international transportation of agricultural products affects national production as the prices of agricultural products coming from far-away places are often lower that the prices of nationally cultivated products. The diversity of fruit and vegetables accessible at the markets and supermarkets has decreased, less landraces and farmer varieties can be found on the market. Several traditional varieties are not cultivated due to economic reasons and lack of knowledge.

The results of a comparative study in the Great Plain show that increasing use of chemicals on fields reduces plant biodiversity and bird abundance, while after reaching a certain limit, it does not improve yields.

The use of broad spectrum insecticides reduces not only the populations of economically harmful insects, but those of other species as well. As a demonstration of this, the species composition of carabid assemblages in apple orchards treated with conventional broad spectrum insecticides and orchards treated mainly with selective insecticides were compared at Újfehértó, Hungary. The less intense insecticide pressure in the orchard treated with selective insecticides has resulted in greater species richness and diversity compared to the conventional orchard. The majority of carabid species is predatory, and plays an important role in the control of pests. Therefore if too much chemicals are used and carabid diversity decreases, pest control can become more difficult.

After a sharp decline beginning in 1990, the use of chemicals is growing since year 2000 (Figure 21.). Today, management intensity in Hungary is lower than in Western Europe, e.g., herbicides were being applied to 25%, insecticides and fungicides to 11% of the total agricultural land in 2002. In the meanwhile, the target of reducing by 20% the 1999 level of use of chemicals dangerous for the environment and human health has been achieved for 2008. Authorization in the European Union has become stricter, therefore the permit for most toxic and pollutant substances has been withdrawn and safer products are used.

Figure 21. *Use of agriculture chemicals in Hungary. Source: Hungarian Ministry of Environment and Water (2009): National Environmental Program 2009-2014 (draft).*



Forests

Overview of status of forests and their biodiversity

The forest area has grown in Hungary (Table 8.) mostly with plantations. 20.3% of the country is forested at the moment (Figure 22.). The share of state-owned forests is 56%, while 43% is private and 1% is community-owned. Private forests are managed by 27,000 individuals representing 300,000 private owners with small scattered plots. Forest areas under the management of national parks have increased from 27,458 ha in 2003 to 33,504 hectares in 2008. When considering the land use type of protected areas, 46.7% of nationally protected areas are covered by forests.

Table 8. *Growth of the forest area in Hungary between 2001-2007 (hectares). Source: Hungarian Ministry of Agriculture and Rural Development, National Forest Databank.*

	2000	2001	2002	2003	2004	2005	2006	2007
Area covered by trees (thousand hectares)	1,784	1,798	1,821	1,834	1,843	1,853	1,870	1,891
Share of forests compared with the whole territory, %	19.2	19.3	19.6	19.7	19.8	19.9	20.1	20.3

Figure 22. Forest cover in Hungary. Source: Central Agricultural Office, www.aesz.hu.

According to a scientific estimate 37% of the forests are considered semi-natural (Table 9.). The ratio of indigenous tree stocks exceeds 57%, while non–native species (black locust, red oak, pine) trees grow on 23% of and poplar clones on 6.9% (Table 10.). 63.5% of forests have primarily an economic function, while 35.2% have protective functions. The role of the remaining 1.3% is health-care, tourism, education and research.

Table 9. *Share of different types of forests in Hungary. Source: Bartha (2004).*

Type	Total area ha	Proportion
Semi-natural forests	657,782	37.0%
Intermedial forests	333,884	18.8%
Plantations	787,051	44.2%
Total	1,778,717	100%

Table 10. *Distribution of tree species in Hungarian forests. Source: Central Agricultural Office (2008).*

Proportion of forest	(%)

area	
Oak	20.9
Turkey oak	11.1
Beech	5.9
Hornbeam	5.2
Black Locust	23.7
Hybrid poplar	6.9
Native poplars	3.6
Other broadleaved	10.7
Coniferous	12.1

The role of nature-oriented forestry is increasing in Hungary (Table 11.), which helps to increase the naturalness of Hungarian forests.

Table 11. *Nature-oriented forestry in Hungary. Source: Central Agricultural Office (2008).*

Year	Transition system[1]	Selection system[2]	Non-timber production function
	Hectare		
2004	0	208	28,593
2005	0	2,901	36,598
2006	4,024	4,956	44,034
2007	8,780	7,220	47,546

[1] The destination is the achievement of the selection system.
[2] Individual trees or groups are harvested periodically.

Forest reserves are protected forest areas, where human activities are permanently prohibited in order to let natural processes dominate in the long term and to provide sites for research. The national network of forest-reserves was enlarged with 4 new sites (Sümegi Fehér-kövek, Kelemér-Serényfalva, Bükkhát, Nagybugaci Ősborókás), so currently it comprises 63 reserves. Therefore the total area of the network increased from 9,730 hectares in 2000 to 13,000 hectares in 2008. Researches in several reserves were conducted on tree-stand structure, dynamics and forest-ecology, soil science, botanics and methodology.

According to a recent study comparing protected and non-protected forests with natural tree composition in mountain areas of Hungary, the naturalness of protected forest is slightly higher than that of unprotected ones. There was almost no difference between protected and strictly protected areas. According to data received from the MARD, the national average of naturalness in ‘forest stands with native tree composition’ is 58.5%; that of ‘forest stands with site-alien species’ is 53.5% and in case of ‘forest stands with non-indigenous species’ it is 40.4%.

Trends (i.e. changes in status, providing data in time series if available)

The above section provides data on the trends in the territory of forest areas.

Changes in abundance of forest birds in the last decade are shown on Figure 7. of the first chapter. Trends in biodiversity of forest Macrolepidoptera assemblages are found in the “General overview / Trends” section.

Main threats to biodiversity

Threats to forest biodiversity are the proportion of clear-cutting in private and protected stands, dead wood removal from the forests, overpopulation of game animals at certain areas and spread of alien tree species, conservation measures are difficult to implement at certain privately owned forests.

Grasslands

Overview of status of biodiversity and trends

Hungarian grasslands have outstanding nature conservation importance in European scale, and are often more diverse than in many other countries. Most of them are secondary grasslands, which means that they were formed in the past few thousand years due to the certain land use methods. Their maintenance and the preservation of their rich biodiversity depend on the human use in the future too.

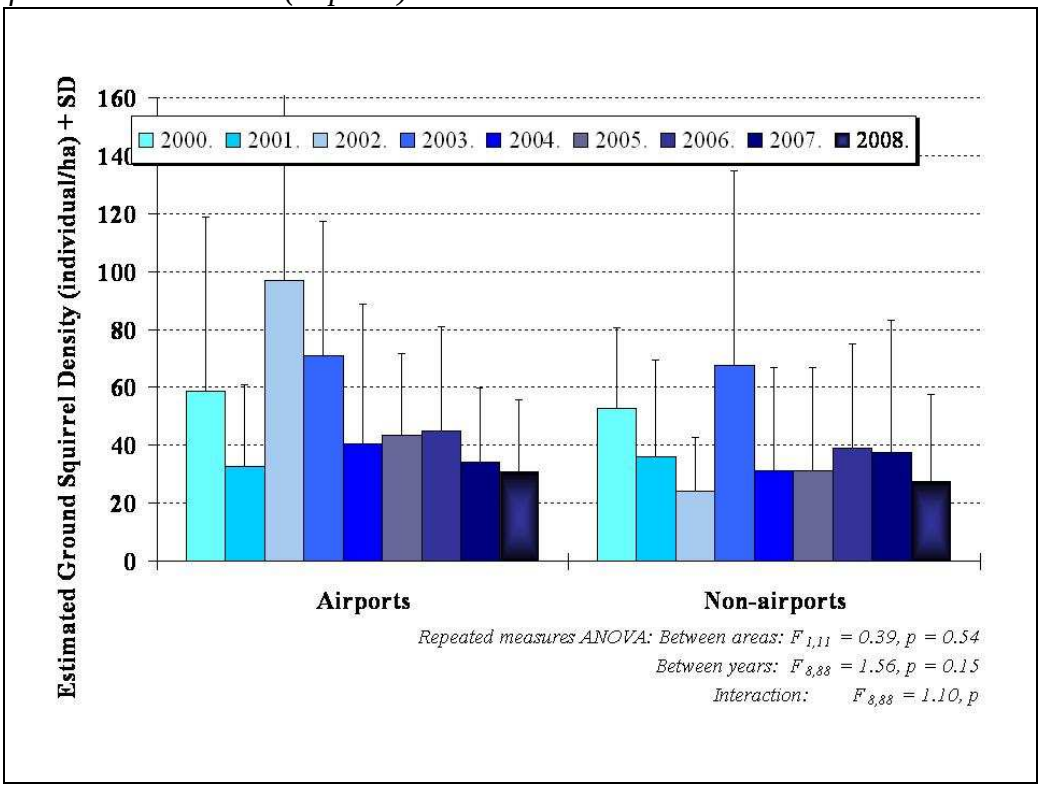
1,000,000 ha, approximately 10.8% of the country’s territory is covered by grasslands. This includes:

-colline and montane hay meadows, acid grasslands and heaths,
-halophytic habitats,
-dry open grasslands,
-dry and semi-dry closed grasslands,
-non-ruderal pioneer habitats, and
-other non woody habitats.

A strictly protected grassland species with high conservation value is the Hungarian meadow viper (Vipera ursinii rakosiensis) which occurs only in Hungary. This small venomous snake disappeared from most of its known range during the last decades. Most of the species’ grassland habitats were ploughed, and the remaining ones were mowed intensively, which was intolerable for the species. Collection for trade purposes and intentional killings further reduced its numbers. Remaining small and isolated populations became vulnerable and small, local catastrophes can fully destroy them. Recently it is the most endangered member of the Hungarian vertebrate fauna, as estimations put its numbers under 500 individuals. A special conservation program is running since 1993 to conserve the species. In 2004, a LIFE program partly funded by the EU was started with the following activities: grassland reconstruction on formerly seized habitats; creation and operation of Hungarian meadow viper Conservation Centre; monitoring and related studies; public awareness activity. In the Conservation Centre, captive breeding was started with 10 adult vipers, collected from several habitats. These animals are reproducing successfully for the fifth consecutive year, resulting today's number of 378 Hungarian meadow viper being kept at the Centre. Reintroduction will start in the close future, under a new project supported by LIFE+.

Populations of European ground squirrels, living on open grasslands and airports are monitored by the Hungarian Biodiversity Monitoring System. No significant temporal changes have been detected in the period 2000-2008, although at some sites squirrels have disappeared in the last years (Figure 23.).

Figure 23. European ground squirrel density changes estimated by the Hungarian Biodiversity Monitoring System between 2000-2008. Differences between years are not significant. Source: Váczi (In press).



Hungarian great bustard is another typical species of agricultural areas and grasslands, changes in population are presented in the "Trends" section of the "General overview" chapter.

Botanical surveys of seven rocky grassland communities in the Transdanubian and Northern Mountains were recorded in the 1930-60s and re-investigated in 1991-94. Significant changes in species composition have been detected: the frequency of rocky grassland specialists and generalists has decreased. Species adapted to extreme water and nitrogen limitation have become less frequent, while frequency of short-lived plant species has increased. On the other hand, the communities have conserved their characteristic species composition despite the observed changes.

Main threats to biodiversity (drivers or causes of changes)

Grasslands are often not used or are abandoned, which leads to spontaneous spread of shrubs and/or invasive alien species, spontaneous afforestation and accumulation of

household wastes. Improper management methods as well as human-induced damages (for example, offroad driving, motocross and quadruped riding, trampling) may also negatively affect biodiversity.

Inland waters

Overview of status of biodiversity and trends

Hungary, situated in the heart of the Danube Basin, has considerable surface water resources 95% of which comes from abroad. The country's borders are crossed by 24 incoming rivers, bringing in 112 billion m^3 of water per year. As the difference of domestic waterfall and evaporation is 6 billion m^3/year, the total stock is 118 billion m^3/year. The Hungarian Danube traverses 417 km, forming the border with Slovakia in the north-west and thereafter flowing south. In the east, also flowing southwards is the Tisza, covering 595 km before reaching Serbia and Montenegro where it later flows into the Danube. About 25% of the country is comprised of floodplains and 25% of the population is living in reclaimed floodplains. Hungary is reliant on upstream countries for water supply and the vast majority of public supplies come from groundwater.

Of 876 natural and 150 artificial water bodies identified in Hungary, 579 freshwater surface bodies (56%) have been classified as being "at risk" from organic, nutrient or priority hazardous substances (according to the EU Water Framework Directive definitions). Approximately 70% of artificial lakes (mainly fishponds) are 'at risk' from organic and nutrient loads. None of the 108 groundwater bodies identified are considered to be 'at risk' due to human intervention, but 46 sites are listed as 'possibly at risk' (mostly from nitrate pollution from diffuse sources).

Changes in the overall status of Hungarian surface waters can be measured by the change of measure sites between categories I. to V. (I. standing for best quality). Between 1999-2006, oxygen indicators showed a little deterioration, while indicators related to dissolved organics, microbiology have enhanced. The most spectacular improvement was that of micro-polluters, where 50% of measure sites became category I or II, while the number of category V sites has decreased. Water quality of big rivers remains acceptable; the status of some rivers has improved. Status of little waters is more unfavourable, because in some cases, their loading of pollutant is higher than their capacity of self-cleaning. Water quality of big lakes is fair, that of Lake Balaton is excellent. Latter is the result of a comprehensive water-quality protection strategy and connected investments, which diminished the pollution-load of the lake by almost 50%.

28 Hungarian wetland habitats are listed on the Ramsar List with a total area of over 233,000 ha. The Ramsar sites in Hungary include all characteristic types of wetland areas in the Carpathian Basin: lakes, marshes, alkaline lakes, bogs, backwaters, river stretches, wet meadows, man-made fish farms and reservoirs. Certain sites were qualified by fulfilling several of the criteria of international importance (e.g.: Hortobágy, Kardoskúti Fehértó, Lake Fertő and Gemenc), while other Ramsar sites in Hungary also meet at least two criteria. Since 2005, 5 new Ramsar sites and 2 extensions have been declared, with a total area of over 53,000 ha and an already existing Ramsar site was declared a transboundary site with Slovakia (Ipel/Ipoly).

The ecological condition of the big lakes (Balaton, Velencei, and Fertő) has been improved due to smaller nutrient loads as a result of the drastic drop in fertilizers' use, as well as governmental measures and environmental investment programmes. For other lakes, the eutrophication rate has generally been decreasing, but threat still remains.

Pannonian salt steppes and salt marshes occur only in a few countries of the European Union; the largest surface area and the centre of distribution of this habitat type are in Hungary. The enrichment of salt in the soil of these habitats is due to high evaporation of ground water during summer. There is characteristic zonation of vegetation, based on inland flooding regime, with dominant salt-tolerant grasses and herbs that tolerate or even demand salt concentrations in the soil water. Compared with other salt lakes and marshes of the world, the alkaline lakes of the Carpathian Basin are characterised by lower salt content but higher alkalinity. Due to limited geographical distribution, they belong to the most threatened European communities. The mosaic-like structure of different habitats supports an exceptionally rich fauna and flora, with several endemic species. Many Pannonic salt steppes and salt marshes were totally destroyed for agricultural purposes. Ploughing for agriculture is still a major threat. Those remained are threatened by agriculture – impact of eutrophication and lack of management as well as by water management. Lowering of water table connected with river regulations and building of canals have very negative impact on those ecosystems. Primary alkali steppes do not need any active management. Grasslands are relatively fragile and can only stand extensive grazing. Number of grazing animals has decreased dramatically and distribution between grazing species has changed also.

Ecological monitoring of inland water ecosystems has started according to EU Water Framework Directive and the EU nature directives, longer term data on status and trends of species is expected to be available in the next years.

Main threats to biodiversity

One of the threats to inland biodiversity is habitat loss due to the conversion of waterbed and shoreline, which mainly happened in the past. Other threats to inland waters include inadequate water quantity and non-natural water dynamics due to uncontrolled use of surface and underground water resources, problems with certain water power plants (Bős-Nagymaros Water Power Plant) etc.

Pannonian salt steppes and salt marshes are threatened by agriculture (impact of eutrophication and lack of management) as well as by water management.

Other difficulties include removal of perverse incentives and legislation supporting cultivation of regularly flooded areas.

Chapter II. Current Status of National Biodiversity Strategies and Action Plans

A brief description of the NBSAP, identifying the main or priority activities

The **National Biodiversity Strategy and Action Plan (NBSAP)** was developed with the involvement of relevant sectors, governmental and non-governmental organizations. After a long preparation phase the NBSAP was approved by the Ministry of Environment and Water in 2004. Although the MEW tried to submit the document for government approval, the process was stuck due to political reasons. Therefore, the document is used as a background and reference information but can not be considered as an approved, intersectoral document.

However, in order to obtain government and parliament approval, the above mentioned NBSAP was reviewed in 2008. The reviewed version has been incorporated into the third National Environmental Programme which is currently at the final stage of the interministerial and public conciliations, after which the NEP is to be approved by the Parliament in 2009. Accordingly, the National Biodiversity Strategy, which is the national strategy on the implementation of the CBD, will be approved by the Parliament as well. The integration into the third NEP aims to mainstream biodiversity considerations into other sectors. The monitoring of implementation of the NEP is dune by a regular reporting.

The NBSAP, which was approved by the MEW consists of a framework chapter determining the strategic objectives of biodiversity conservation and nine thematic chapters (mining; forestry and forest management; fisheries management, fishing, angling; agriculture; regional development and tourism; land use; hunting; water management; and molecular biology methods).

The strategic objectives as set out in the NBSAP are:

- Conservation and improvement of the status of protected natural areas;
- Conservation and development of biodiversity outside protected natural areas;
- Strengthening ex-situ conservation;
- Sustainable use of biodiversity and its components, and putting in place the instruments and tools required for sustainable use;
- Development of social awareness, required for the conservation and enhancement of biodiversity: education, training and information;
- Fair and equitable sharing of benefits arising out of the utilisation of genetic resources;
- Integration of biodiversity conservation considerations into sectors, sectoral strategies, regional, micro-regional and local plans and programmes.

The main policy objectives and priorities of the relationship of economy and environment are laid down in the successive **National Environmental Programmes**. The first six-year National Environmental Programme (NEP-I, 1997-2002), approved by the Hungarian Parliament in 1997, focused mainly on the reduction of the emission of traditional pollutants. The **second National Environmental Programme (NEP-II)** adopted in 2003, aimed at the integration of the objectives of environmental policy into economic, sectoral and regional strategy preparation, planning and programming activities for the period 2003-2008.

The prime objectives of NEP-II were:

- The protection of the ecosystem,
- Provision of a harmonic relationship between society and environment
- Enforcement of environmental criteria in economic development.
- Strengthening of knowledge on, and awareness of environmental processes, impacts, environment and nature conservation and co-operation.

The key areas of implementation of the NEP-II are the thematic action programmes of:

- Raising Environmental Awareness;
- Climate Change;
- Environmental Health and Food Safety;
- Urban Environmental Quality;
- Biodiversity Conservation and Landscape Protection;
- Rural Environmental Quality, Land-area and Land Use;
- Protection and Sustainable Use of Water;
- Waste Management;
- Environmental Security.

As a part of the National Environmental Programme, the second **National Nature Conservation Master Plan** (NNCMP) was adopted; it determines the objectives and policy on conservation of nature and biodiversity. The priorities of the second NNCMP (containing concrete activities and measures for implementation) are the following:

- continuing to develop the system of protected natural areas;
- the preservation and improvement of the status of protected natural areas and landscapes;
- elaborating and accomplishing management plans, working out and fulfilling conservation plans;
- obtaining property administration right at as many protected natural areas as possible, particularly in the course of the reconstruction of the level of protection;
- conceptual foundation and regulation of the property administration activity;
- restoration of habitats and landscapes;
- organising the data in property register of protected and to-be protected lands, with regard to the territories to be given to the management of directorates of conservation areas;
- researches establishing nature conservation and landscape protection actions;
- reviewing property rights (special hunting and fishing grounds subject to conservation priorities);
- operation of overall programmes to ensure the conservation of biodiversity;
- accepting the national biodiversity strategy and action plan;
- designation and protection of the national ecological network;
- drawing up and proclaiming the list of natural areas;
- the extension of the National Agri-Environmental Programme in favour of preserving natural assets;
- carrying out monitoring with the aim of nature conservation;
- reinforcing the conservation and welfare functions of forests;
- introducing the institutions of compensation and subsidies;

- involving non-governmental organizations and local authorities to fulfil public nature conservation tasks;
- surveying the particular landscape features, ensuring their protection, increasing the efficiency of general landscape protection;
- elaborating and accomplishing protection plans for the preservation of stocks of endangered species;
- preservation and surveying caves and geological and geo-morphological resources;
- staff increase at regional bodies of nature conservation;
- maintenance and development of information and registration systems of nature conservation;
- setting up the Natura 2000 system in accordance with the accession to the EU, as well as the accomplishment of the conservation tasks of the Water Framework Directive of the European Union;
- full accomplishment of the obligations of international conventions ratified by Hungary,
- enhancement of social awareness of nature conservation and elaboration and accomplishment of a communication strategy;
- elaboration of the concept of ecotourism, development of services;
- awareness-raising activities, education.

The **third National Environmental Programme** (NEP-III, 2009-2014) with the third Nature Conservation Master Plan have already been drafted, the adoption process in under way. The National Biodiversity Strategy will be part of this document. The priorities of the third Nature Conservation Master Plan are:

- making the Natura 2000 network operational;
- elaborating conservation management plans and cross sectoral integration of biodiversity considerations;
- accomplishing tasks related to nature conservation under Hungarian Presidency of the EU;
- preserving and improving the status of protected natural areas; and
- making fully operational the Nature Conservation Information System.

An overview of progress made in implementation of priority activities or actions, focusing on concrete results achieved

The following information provides a summary of the progress made in the implementation of the Action Programme of Biodiversity Conservation of the second National Environmental Programme between 2003 and 2008:

Strategic planning of conservation

- Several strategic documents aiming at biodiversity conservation have been developed, with regard to forestry, hunting, eco-tourism, information system, etc.
- Biodiversity considerations have been integrated into several sectoral development plans.

Preparation of conservation action plans

- Between 2003-2008, conservation action plans of 51 protected areas were published, and 36 documentations were prepared.
- The total area covered by conservation plans for nationally important protected areas has grown to 35.695 ha. Documentation is under preparation for other 275.000 ha.

Species conservation

- The second National Environmental Programme envisaged reducing the number of protected plant and animal species, but it has grown slightly since 2003.

Changes in the number of protected species in Hungary between 2003-2008.

	Plants	Animals	Lichens	Fungi
2003	695	965	-	-
2008	720	997	8	35

- Between 2004-2006, conservation plans of 22 endangered animal and 20 plant species were promulgated by ministerial decree. Implementation of conservation plans was continuous.
- Implementation rules for compensation related to restrictions by conservation measures have been promulgated and already applied for several species.

Actions against invasive species

- In accordance with the European Strategy on Invasive Alien Species, collection and systematization of research and management experiences about invasive species in Hungary has started, and the provisional list of domestic invasive plant and animal species was compiled.

Revision of the National Ecological Network

- The Ecological Network has been reshaped – core areas, ecological corridors and buffer areas provide the basement of the new regulation.
- The network is included in the National Spatial Plan as well. Natura 2000 areas have been classified in the zones (core areas, ecological corridors and buffer areas) of the network.

Increasing the share of protected areas

- Between 1999-2008, the size of protected areas in Hungary increased, for details see table 1. of Chapter 1. The registry system has been converted to geographical information system, and data became more accurate.

Restoring the previous level of conservation of protected area

- The most effective way of conserving protected areas is keeping them in state ownership. After the political changes in 1990, many lands were privatized. According to a law of 1995, 250,000 hectares of such protected lands should be purchased again by the state. Until 2007, about 141,000 ha were purchased, but due to lack of funds, the process has slowed down. It is not probable that all the above-described area will be in state ownership again by the end of 2010.

Natura 2000

- The European Union Natura 2000 network of protected areas was established in 2004. Approximately 21% of the country's territory (1.91 million ha) belong to the network.

- Ex lege protected areas
- Since 1995, when the Act on Nature Conservation came into force, all springs, bogs, swallets, salt lakes, tumuli and earthen fortifications are protected ex lege.
- Between 2003-2008, a programme was carried out to survey all springs in Hungary. From the more than 5015 surveyed springs, 2479 fulfilled the criteria of ex lege protection. There is a similar, ongoing programme for swallets as well. According to other surveys, there are 1649 tumuli and 373 earthen fortifications in the country. According to data not finalized yet, the summa area of ex lege protected bogs is 64,971 ha, that of salt lakes is 20,365.

Landscape protection

- The revision of the National Spatial Plan constituted one step forward in the good direction because it regulated the zones of landscape protection. With the regulation of the ecological network, the conservation of many areas not officially protected can be guaranteed.

Conservation management and habitat-restoration

- Between 2003-2008, restoration of water habitats of great importance begun, and attempts were made to stop the further deterioration of habitats conserving the unique values of the Carpathian basin – dolomite rock grasslands, sand associations, remains of lowland oak forests. Furthermore habitats of important species as the great bustard and the meadow viper were improved.

Game management at protected natural areas

- Big game populations kept in too high levels cause high damages to natural values and at some places make impossible the natural reforestation. Therefore in the long term they change in a bad direction the structure of the forest and narrow down the genetic diversity of plant species. As a result of a programme implemented jointly by the Hungarian Ministry of Environment and Water and the Ministry of Agriculture and Rural Development, the increase of populations stopped and a little decrease started in the first part of the period 2003-2008. However, in 2007 big game species numbers started to increase again.

Nature Conservation Information System

- The Nature Conservation Information System is a part of the National Environmental Information System. It is a computer-based information system with a complex geographical information foundation; the concept was laid down between 2002-2006. The aim of the system is to provide information for the strategic planning, work of the authorities, public information, and to help the assessment of the impact of conservation management and measures.

Hungarian Biodiversity Monitoring System (HBMS)

- HBMS is a long-term programme to observe the state of Hungarian biodiversity. Since 1998 it has been providing long term datasets on the actual tendencies related to biodiversity, and on their direction and speed. These help the authorities in decision-making.

- Capacity building in education and public awareness-raising
- National Park Directorates are currently operating 26 visitor and education centres. Some of these were constructed or renovated in recent years in order to provide interactive, visitor-friendly spaces.
- Number of nature trails has grown as well up to 148; some of them should be renovated.

Ecotourism

- In 2005 and 2008, the Ecotourism Concept of Nature Conservation and the National Ecotourism Development Strategy was developed.
- The main scenes for ecotourism organised by National Park Directorates are the conservation visitor centres.
- In cooperation between the Hungarian Tourism Company and the Ministry of Environment and Water the '2007 – Year of Green Tourism' was organised; National Parks provided a vast offer of programmes.

Nature parks

- Several nature parks were founded by local governments and NGOs in Hungary – their activity has recently been regulated by the Ministry.

Indication of domestic and/or international funding dedicated to biodiversity conservation activities

Between 2003 and 2008, the funding dedicated to nature conservation activities has changed significantly. After Hungary's accession to the European Union instead of domestic funds, financial resources from the European Union became dominant.

In the period between 2007-2013, greater amount of project-based funds are available for activities aiming at biodiversity conservation. Financial sources for biodiversity related activities include the Life+ financial instrument and the Environment and Energy Operative Programme of the 'New Hungary' Development Plan. The following activities can be financed from these financial instruments: best practice or demonstration projects that contribute to the implementation of the EU's nature conservation directives (Birds and Habitats Directives), projects that contribute to the implementation of the EU's Biodiversity Action Plan, habitat reconstruction; ecotourism activities; conservation of threatened species; investments for nature conservation etc. The domestic budget for nature conservation is a very small percentage of the national budget. Despite the EU funds, the domestic budget for nature conservation should be increased.

Chapter III - Sectoral and cross-sectoral integration or mainstreaming of biodiversity considerations

Framework and processes of sectoral and cross-sectoral integration

The purpose of the chapter is the description of efforts to integrate biodiversity conservation and sustainable use into relevant sectoral and cross-sectoral plans, programmes and policies in Hungary.

One of the key challenges for Hungary is how to reconcile the improvement of the quality of life and environment, preservation of environmental assets and biodiversity, and sustainable use of natural resources with economic development and economic interests. Hungary has managed to preserve its biodiversity to a large extent. However, the efficiency of measures to protect the environment has not reached the desirable level yet. The real challenge is not only integrating biodiversity into sectoral policies but to achieve the real implementation of these principles.

The main policy objectives of the relationship of economy and environment are laid down in the successive National Environmental Programmes. The first six-year National Environmental Programme (NEP-I, 1997-2002), approved by the Hungarian Parliament in 1997, focused mainly on the reduction of the emission of traditional pollutants. The second six-year National Environmental Programme (NEP-II, 2003-2008) adopted in 2003, aimed at the integration of the objectives of environmental policy into economic, sectoral and regional strategy preparation, planning and programming activities. The third National Environmental Programme (NEP-III, 2009-2014), including the third Nature Conservation Master Plan, has already been drafted, the adoption process in under way. The overall target areas of NEP-III are the followings: improving the quality of urban life and environment; conserving natural resources and assets; promoting sustainable livelihood, production and consumption, and improving environmental safety. The National Biodiversity Strategy will be part of NEP-III.

The National Environmental Programmes are always adopted by way of parliamentary resolutions. Financing for the NEPs are provided mainly through the national budget, adopted annually in the form of an act of Parliament or through European funds, governed by European Community (EC) regulations.

During the development of national policies (legislation, strategies and programmes), inter-ministerial conciliation takes place. This mechanism ensures that all relevant sectors have the possibility to influence the decision making process. In this way, the Ministry of Environment and Water makes efforts to integrate biodiversity conservation aspects into sectoral and cross-sectoral policies.

After a decade of preparatory work in 2007 the institution of the Commissioner for Future Generations was established by the Hungarian Parliament. Above all, the Commissioner is an environmental ombudsman: his principal responsibility is to safeguard citizens' constitutional right to a healthy environment. He is empowered to carry out investigations in relation to all issues that may affect citizens' constitutional right to a healthy

environment. Thus the field of competence of the Commissioner also extends to issues concerning biodiversity conservation.

Integrating biodiversity conservation into relevant sectors

Agriculture

The National Agri-Environmental Programme (NAEP), launched in 2002, was prepared in the framework of a multiannual co-operation of the Ministry of Agriculture and Rural Development and the Ministry for the Environment and Water. Within this, the areas with significant natural value were addressed as a zonal target programme of Environmentally Sensitive Areas (ESA).

In 2002 the rules applicable to Environmentally Sensitive Areas (ESAs) were set in legislation (Joint Decree of the Minister of Environment and Water and of the Minister of Agriculture and Regional Development). It identified three categories of ESAs: highly important ESAs (without low-input production their maintenance is doubtful in medium time period.), important ESAs (low-input production is necessary to the conservation of their values or to improve their condition) and planned ESAs (the natural value of these areas can be increased by supporting extensive cultivation). The total size of highly important ESAs is 1,980,000 hectares. Zonal or horizontal measures facilitate agricultural land uses in line with nature conservation and environmental considerations in an area-based manner and ensure the conservation and maintenance of natural values along sufficient income generation by laying down special conditions. The aim of the programme elements is to contribute to the widespread application of management methods in compliance with the local characteristics, to the establishment of landscape management, and to the conservation and improvement of the environmental and natural values of the area. In the framework of the National Agri-Environmental Programme, ESA measures were initiated in 11 sample areas in 2002, and expanded to 4 further ESAs in 2003.

In 2004, the continuation of the National Agri-Environmental Programme was implemented within the framework of the objectives of the National Rural Development Plan (NRDP). Again, one of the main objectives was to continue – among the agri-environmental measures – the establishment of a system of environmentally sensitive areas which are most important in terms of maintaining the natural environment. Among the measures of the NRDP, farmers, provided that they voluntarily undertake to comply with the management requirements of the measure, are entitled to receive area-based financial subsidies and payments for the favourable environmental performance of their holdings. The amount of payment is proportionate to the complexity of the measure and to the expected effects on the environment and the economic return of production.

In 2004-2009 ESA measures were implemented in 15 sample areas and successful applications were submitted for a three times larger total area (ca. 120,000 ha) than in 2002 when the programme was initiated.

The European Agricultural Fund for Rural Development (EAFRD) provides new opportunities for compensating environmental and conservational management prescriptions and for subsidizing voluntary agri-environmental and forest-environmental measures. Based on the EARDF regulation of 2005 Natura 2000 payment was launched in 2007. Regarding the obligatory management prescriptions of the Natura 2000 network this payment (38

euro/hectare) compensate the income foregone and the extra costs of the farmers managing Natura 2000 grassland areas. In 2008 the Payment Agency received 2,634 applications with a territory of 73,000 ha in this measure. The Ministry of Agriculture and Rural Development (MARD) and the Ministry of Environment and Water intend to provide facility to launch the Natura 2000 payments in forest areas as well.

By finding the suitable balance between the compulsory conservational requirements and the possibility of voluntary measures the agri-environmental measures under the New Hungary Rural Development Plan (NHRDP) will be implemented in 2009. Taking the various environmental characteristics of agricultural areas into consideration, and in order to implement high quality environmental management programmes, 21 different schemes have been defined within the framework of this action (9 for arable plant production, 6 for grassland management and planting, 3 for the environmentally friendly management of plantations and 3 for the management of wetlands).

The general programme specifications are:

- implementation of the management prescriptions of the scheme undertaken, compliance with the eligibility criteria during the entire term of the support (5 year, or in case of compulsory set-aside for water-protection purposes scheme 10 years)
- compliance with the guidelines set forth in Article 4 and 5, as well as Annex III of European Union Regulation 1782/2003/EC pertaining to mutual correspondence, and the requirements stipulated in Annex IV of the Regulation on the maintenance of "good agricultural and environmental conditions" in the area of the farm,
- compliance with the minimum requirements of nutrient management and the pesticide use on the whole farm,
- keeping farm management records for the whole farm,
- participation on 2 agri-environmental trainings (organised by the MARD) during the schemes period.

On improving of the ESA network the zonal agri-environmental schemes with high environmental performance will be eligible in 2009 for farmers in 25 sample areas, on approximately 914,000 ha. The overlapping of ESAs with the Natura 2000 sites is quite notable as more than 50% of this area is part of the Natura 2000 network as well.

According to the NHRDP the 'Assistance provided to non-productive investments' measure will also be implemented in 2009, in order to conserve the rural landscape, to promote the maintenance of the individual value of the landscape, increase of the richness in species of the fauna and flora, an improvement of the environment's condition, facilitation of the fulfilment of the commitments made on a voluntary basis and increase public welfare in the areas of high natural value, specified in Natura 2000. Serving the habitat rehabilitation goals of the Natura 2000 areas the measure allocates sources among others for plantation of hedgerows and field-protecting trees, for establishment of grassland for nature conservation purpose.

Forestry

The main objectives of the forestry policy are: to assure the long-term environmental, economic and social benefits of forests; to harmonise the society's interests with forest

owners' and economic interests; and to increase the forest area up to 25-27% of the territory of the country. However, the practical implementation of objectives promoting biodiversity conservation faces difficulties several times.

Protection of forests and forest biological diversity is incorporated into the National Forest Programme (NFP) for 2006-2015. The NFP states that during the conservation of forests not only species but the whole forest ecosystem should be considered. The target program on "conservation in forests" has a general approach meaning that conservation of natural values, areas and the biodiversity of forests can not be restricted solely to objects (e.g. species, habitats, areas), but whole systems should be protected together with their respective buffer zones. In reasonable cases whole natural areas should be protected together with their ecological potential. NFP includes objectives related to the National Ecological Network and Natura 2000 sites, forest naturalness and biodiversity conservation, as well as to the introduction of near-natural forest management.

According to the currently effective legislation, the integration of nature conservation objectives targeting the maintenance and conservation of forests can be achieved through the system of planning and controlling (conservation management plans, district forest management plans and related administrative system) and the subvention of forest managers.

The main aim of district forest management plans is to provide planning for forest management; therefore they are not primarily targeting conservation planning. However, these basic plans in forestry can not be finalized without taking in account conservation aspects. Accordingly, on the basis of relevant legislation, plans concerning protected natural areas can only be approved in agreement with the Minister of Environment and Water. In the case of non-protected forests the opinion of the Minister of Environment should be taken in notice. In the case of protected forests, until the development of conservation management plans, the district forest management plan must be considered in replacement. The harmonisation of conservation management plans and district forest management plans is difficult as they have different geographical scope and different time-frame.

From 2004 a new opportunity to link nature conservation objectives to management techniques is the forest-environmental measure of the New Hungary Rural Development Plan. Private forest owners will be able to apply for payments regarding special voluntary measures aiming to protect forest biodiversity presumably from 2010. From nature conservation aspects, the most important payments are related to compensation for forests on Natura 2000 sites, voluntary forest-environment payments and afforestation. The support for afforestation is already available, while preparation of the others is ongoing.

The new Act on Forests and the Protection of Forests is currently under development. The draft new act introduces the concept of 'naturalness', according to which forest areas will be classified into six categories from plantations to natural forests. Regarding forests on protected natural areas the regulations of the Act on Nature Conservation will continue to be determinative. The draft new Act on Forests includes and recommends management systems aiming at continuous forest cover. Forests are also classified according to protective, social and economic functions. The new act is planned to include 'Natura 2000 function' among the

protection function, which would be important in case of forests outside protected natural areas.

Fisheries

The National Fisheries Strategic Plan 2007-2013 incorporates ecosystem-based management and identifies at least one specific objective and one medium-term aim towards that end. One of the Specific Objectives of the National Fisheries Strategic Plan 2007-2013 is 'Slowing down the degradation of natural aquatic habitats, restocking indigenous species and reducing the overpopulation of invasive fish species'.

One medium-term aim of the sector concerning production is 'The number of multi-functional farms (fish production, nature conservation, eco-tourism, angling tourism) should be increased, parallel to this fisheries services should develop and production should be demonstrated as many places as possible (e.g. harvesting shows for the public). Integrated pond production should be introduced, as many places as possible and it should be in harmony with the given agro-ecosystem.'

It is also stated in the National Fisheries Strategic Plan that 'Capture fishery has (and always had) an outstanding role in the utilisation of the natural resources in aquatic ecosystems. Based on traditional values, knowledge and experiences it is able to apply a system approach, so called 'wise use', during the utilisation of natural resources in a particular ecosystem.'

Regional development

National Spatial Development Concept (2005) defines the overall objectives of regional development policy until 2020. The document consists of the medium-term national territorial objectives until 2013 as well, for instance spatially integrated developmental priorities for rural areas. This part defines development priorities of the different types of rural area, including 'areas rich in valuable natural and cultural landscape'.

The revision of the Act on National Spatial Plan in 2008 has led to the greater integration of biodiversity considerations into spatial planning. The revised NSP contains framework regulations regarding the land use of the zones of the updated and revised National Ecological Network. The restrictions of the National Spatial Plan (NSP) include the following:

- Within the national ecological network, only special regional or county land use categories and zones may be established which do not damage the natural and semi-natural habitats of the ecological network and their relationships;
- Within the zone, mining activities may be pursued in line with the provisions applicable to mining areas;
- In the Special Regional Land Development Plan and County Land Development Plan, the zones of the national ecological network should be classified as core area, ecological corridor and buffer zone.

The NSP defines further land use restrictions regarding the zones of the core area, ecological corridor and buffer zone as classified in the Special Regional Land Development Plan and County Land Development Plan.

Act on the General Rules of Environmental Protection and Government Decree on the environmental assessment of certain plans and programmes require an environmental assessment of local, regional and national development plans, when they fall under the scope of the environmental assessment regulation. These plans must take account of the interests of biodiversity conservation and in particular the coherence of the Natura 2000 network.

Land use planning

Applicable nature conservation and planning legislation (Act on Regional Development and Physical Planning as well as their implementing decrees) provide for a strict protection of designated nature conservation land and of protected species. The legislative requirements have been reinforced and complemented by the jurisprudence of the Hungarian Constitutional Court which has consistently ruled on several occasions that de-classification of protected land is only possible in the light of overriding interests relating to human health and safety, but not with reference to economic interests. Natura 2000 sites enjoy similar legislative protection.

Building permits or any other development permits can be issued for protected areas at a very limited scope and always subject to the prior approval by the nature conservation authorities. The shoreline and the floodplain of natural or semi-natural watercourses are protected by the Nature Conservation Act. Only water management facilities are permitted in floodplains. It is also prohibited to locate new buildings or any other constructions within 50 metres of the shoreline of natural or near-natural watercourses and wetlands, within 100 metres of the shoreline of lakes and ponds and in the flood-plain of watercourses in designated natural areas.

Transport

An official national standard was prepared and published on ecological corridors arching through public roads in order to offer feasible technical solutions to mitigate habitat fragmentation effects of public roads intersecting natural habitats. The standard is under review, the updated version will be published soon.

The Environment and Energy Operational Programme (EEOP), starting in 2007, finances the establishment of corridors under or over public roads and railroads in order to reduce the adverse effect of linear structures on Natura 2000 network in Hungary.

Energy

Efforts were made to integrate the aspects related to biodiversity conservation in the energy sector especially during the implementation of the activities in connection with renewable energy production and use. The three main pillars of the Hungarian Energy Policy (HEP) for 2007-2020 is security of supply, competitiveness and sustainability. In the context of the HEP, sustainability means taking into account environmental concerns, primarily controlling greenhouse gas emissions. The concrete related tasks are included in the

programmes to improve energy efficiency and to promote the development and use of renewable energy. Biodiversity is not mentioned specifically in the HEP. The basic principle of the Strategy on Increased Utilization of Renewable Energy Sources (2008-2020) in Hungary is to increase the ratio of domestic renewable energy use in accordance with country characteristics and environmental, economic and social sustainability aspects.

A practical example for the cooperation of the energy and nature conservation sectors is the following: The Ministry of Environment and Water and the Hungarian Ornithological and Nature Conservation Society signed a new "Accessible sky" agreement with the major electric companies in 2008 in order to protect bird species against electrocution. The electric companies involved promised a 'bird-friendly' transformation of all dangerous power lines in Hungary by 2020, and agreed to only use 'bird-friendly' methods when constructing new power lines. The work is financed by European and Hungarian funds, and also by the electric companies themselves.

Tourism

The fundamental policy document in the field of tourism, the National Tourism Development Strategy for 2005-2013, places a special emphasis on the integration of environmental concerns into the development of the tourism sector. The three main objectives laid down by the Strategy are as follows:

- Optimization of the effects on society: Greater participation in tourism will contribute to the evolution of a visitor friendly society and ensure better planning conditions (local participation, bottom-up initiatives);
- Preservation of cultural heritage: Hungarian cultural heritage must be preserved. Destinations should differentiate themselves with their specific image (traditions, natural and built environment). Local population should be made aware of beneficial effects of tourism like renovating of built heritage, additional incomes, greater social cohesion and economic diversification. Responsible tourism practices must prevent irreversible damage caused by excessive exploitation of resources;
- Optimization of the effects on environment: Tourist stakeholders, enterprises play a pivotal role in changing environmental attitudes. Tourists must be made aware of the expected behaviour (information, convincing) at protected areas; appropriate argumentation is a better incentive than prohibition. The impact of tourism on global environment must be highlighted besides the local effects. Tourist enterprises and visitors must be informed about the negative effects on biodiversity and the restrictive measures. Environment friendly operation of tourist enterprises must be encouraged (changing of attitudes, regulation, sanctions). The impact of tourism on the environment must be quantified; sustainable destinations must be acknowledged. Air pollution must be reduced through environment friendly solutions. Local raw materials, renewable energy resources should be utilized. Tourist developments need planning and impact assessments.

In addition to the overall strategy of tourism, the National Ecotourism Development Strategy (NEDS) was prepared in 2008 with the coordination of the Ministry of Local Governments and Regional Development and the involvement of the Ministry of Environment

and Water and the national park directorates. The NEDS sets out ecological, socio-cultural, economic and touristic objectives. The ecological objectives are to maintain ecological diversity and to maintain and improve the environmental status of the certain destinations.

Cooperation started between the Hungarian Tourism Company and the Ministry of Environment and Water for the organisation of the '2007 – Year of Green Tourism' campaign. In 2007 in-depth research was conducted on public demand on ecotourism, the outcomes of which can be used in planning processes. In connection with the Year of Green Tourism national park directorates developed special programme offers, services and information systems in tourism. In the framework of the aforementioned cooperation, publications, educational leaflets were published, domestic and international exhibitions (e.g. Hungarian 'Travel exhibition'), public events (Day of European National Parks, Week of Hungarian National Parks, Consultation Days for Eco-tourism) have been organised, marketing and communication activity of national park directorates has been improved significantly. Several new facilities were built at the national parks, for instance visitors' centres, conference and education centres and other programme destinations.

Eco-tourism activities, for instance development of visitor centres, nature trails, complex ecotourism services, are financed from the regional operative programmes of the New Hungary Development Plan.

Case study: Conservation and Sustainable Use of Biodiversity through Sound Tourism Development in Biosphere Reserves in Central and Eastern Europe

The international program supported by the Global Environment Facility and UNEP was implemented in 3 selected biosphere reserves (in Czech Republic, Poland and Hungary) in the period between 2005 and 2008. The overall goal of the project was to promote the conservation and sustainable use of biological diversity through the development and implementation of sustainable tourism practices in the 3 participating biosphere reserves. These practices were consistent with the conservation and sustainable use of vulnerable mountain ecosystem biodiversity by using the UNEP/CBD International Guidelines for Biodiversity and Tourism Development.

In this context the project aimed to:

-Give support to the development and implementation of tourism management plans in relation to biodiversity objectives.

-Create and strengthen an enabling environment for combining sustainable tourism development and biodiversity conservation.

-Support international cooperation among the participating countries, especially with regard to trans-boundary cooperation, to enhance knowledge on tourism and biodiversity.

-Facilitate a consultative process with key stakeholders (in the public and private sectors) to ensure their active participation and influence in the development of public policies for sustainable tourism development and management in vulnerable mountain and forest areas

The project area in Hungary was the **Aggtelek Biosphere Reserve**, where the following main activities were carried out:

A set of sustainability indicators were developed and a monitoring system was established to track and evaluate the role and the social, economic and environmental effects of tourism in the region. In parallel, research was made on the ecological and tourism carrying capacity of the region and selected sites. The findings are to be used in planning.

Landscape history researches helped to identify the traditional land use structures and patterns, which provide information and knowledge to the establishment of farming and land use practices and other activities integrated into the landscape.

Detailed data collection and processing was carried out to provide raw data to other researches and surveys, and additionally to help in the promotion activities and in gathering tourist information.

Long-term tourism management plan was developed for the Aggtelek National Park, which also deals with the surrounding areas and the transboundary linkages.

Based on the demands of the stakeholders, training courses, education programs and other capacity building actions were carried out.

Of the traditionally managed agricultural areas, special attention was given to extensive orchards, because these habitats harbor unique, endangered and irreplaceable fruit types (genetic diversity) on the one hand, and integrated elements of the traditional landscape on the other. Maintenance of these sites is essential for the local as part of the traditional life, and also as an attraction for tourists. Attention was given to the conservation of related infrastructure, too, thus a community fruit dryer was be built. To maintain the genetic variability of the fruits in the region, in-situ and ex-situ gene banks was established, and the local population has been encouraged to use them.

As an economically underdeveloped region, the people of Gömör-Torna Karst in the Aggtelek Biosphere Reserve still bear the traditional culture and knowledge. Based on this knowledge, tourism product development (services built on local resources, like itineraries and syllabuses for guided walks and nature trails, exhibition plan outlines, souvenirs, modern articles) and coaching of local craftsmen was another activity of the project.

Traditional housing is essential in soft tourism. The project area is rich in beautiful old buildings, but unfortunately the task of maintenance in many cases exceeds the capacity of the owners. Within this program, guidelines and information were provided to the locals on how to renovate and maintain the traditional housing patterns; moreover, minor financial contribution was also given to such activities.

During the project period, the most important tourism-related event (a 10-day-long cultural festival) in the region was also supported, with special attention to increase the number of actively involved communities from both sides of the state border (Slovakia/Hungary).

In order to utilize the achievements of the project (for the benefit of the local stakeholders) to the highest level possible, a holistic marketing plan was developed. To strengthen promotion and to provide quality insurance, a regional qualification and labeling scheme was drafted.

Although the direct project area covered Aggtelek BR, a transboundary approach was applied during the implementation. Stakeholders from the neighboring Slovensky Kras BR were encouraged to join the relevant activities in Hungary (due to the special history of the region, there was no need to tackle language barriers). This horizontal feature helped multiply the impacts of this composite, 3-years program.

At the Ninth Meeting of the Conference of the Parties to the CBD a side-event was held on 22 May to highlight results, good practices and lessons learned from this UNEP/GEF project. In parallel with the side event in Bonn, a press conference and the closing celebration of the UNEP/GEF project was organized at the project site in Jósvafő, Aggtelek National Park in Hungary.

Education

Environmental education is incorporated in the educational legislation. According to the amendment of the Act on Public Education every Hungarian public educational institution must develop its programme for school-based environmental education. The development priorities of Hungarian public education are spelled out in the Mid-term Strategy for Public Education, issued by the Ministry of Education in 2004.

The Nature Schools and Nursery Schools Programme is jointly operated by the Ministry of Environment and Water (MEW) and the Ministry of Education and Culture (MEC), and it is being implemented with the involvement of the Hungarian Federation of Environmental Study Centres as a partner institution. The programme is organised during the school term with the aim is to make students become more familiar with the natural environment and biodiversity, to raise awareness about the importance of sustainable development and biodiversity conservation. In order to legitimise the Nature School and Nursery School qualification procedure, the MEW, the MEC and Hungarian Federation of Environmental Study Centres signed a co-operative agreement in 2007, which ensures the continuity of the qualification activity. On the basis of the certification procedure and the agreement of the three above mentioned responsible institutions, 100 nature school service provider institutions and one nature nursery were certified in 2008.

The Green Nursery Schools Programme extended environmental education to the lower grade education. Every year the MEW and the MEC jointly announce a call for applying for the ‘Green Nursery School’ awards.

The Hungarian Eco-School Network coordinates schools that have the pedagogical values of sustainability at the centre of their operation and gives them assistance by the provision of information, organisation of training courses and events. The difference between an eco-school and an ordinary school is that the principles of environmental education and the pedagogy of sustainability prevail not only in teaching but in all areas of school life. The network is open to all public education institutes in Hungary. Over 350 institutions have been granted the honourable title and the Eco-School Certificate.

Other national and sub-national strategies, programmes and processes

New Hungary Development Plan

The most relevant objective of the New Hungary Development Plan (NHDP) relates to raising the level of employment and establishing conditions underpinning permanent growth. Therefore, development was launched in 6 priority areas, namely: economy, transport, initiatives targeting social renewal, environmental protection and energy, regional development and tasks relating to state reform. The government has approved 15 operational programmes of the New Hungary Development Plan, within the framework of which development activities are financed in the period of 2007-2013 with the assistance of EU funding.

The **Environment and Energy Operational Programme** of the New Hungary Development Plan 2007-2013 integrates biodiversity conservation measures, in particular in the 'Wise management of natural assets' priority axis. Main objectives under this priority axis are to protect and restore protected natural and Natura 2000 areas and assets and to support environmental education. Projects aiming at the implementation of these objectives are financed from EEOP in order to preserve the natural and traditional landscape features, and individual landscape values of the Pannonian biogeographical region.

New Hungary Rural Development Programme

The NHRDP is discussed in the above section on Agriculture.

National Sustainable Development Strategy

The National Sustainable Development Strategy (NSDS) was approved by the Government in June 2007. One of its basic principles is the sustainable management of natural resources and biodiversity. Based on the processes and trends threatening sustainability, the NSDS sets priorities in order to facilitate sustainability by positively affecting key processes.

One of these priorities is to protect natural values and biodiversity. Preserving the operability of natural ecosystems is a fundamental prerequisite for the sustainability of both the economy and of social life. Under this priority, the most important fields of action are the followings:

- *Active protection of natural values.* This includes the conservation of habitats, species biodiversity and sustainable land use.
- *Integration*. This action describes that biodiversity may be preserved and natural resources may be sustainably used only through an active effort on the part of all players of the economy and all members of society. Regarding the required actions and steps in the areas of spatial development, tourism, hunting, mining, and fisheries, it refers to the relevant parts of the National Biodiversity Strategy.

- *Institutional protection*. In order to slow down and stop degradation processes in nature, this action aims that, sufficient funding should be provided for institutional nature conservation.
- *Change lifestyle and attitude*. The success of efforts aimed at preserving the natural environment depends on whether people regard biodiversity valuable and whether people understand the complex relationships involved and the interdependence of nature, society, and economy. Strengthening environmental awareness, facilitating the process of understanding and encouraging people to adopt sustainable modes of life are crucial requirements.
- *Participation*. The active participation of all stakeholders is needed in the implementation of actions.

National Climate Change Strategy

The National Climate Change Strategy (NCCS) for the period 2008-2025 has two main parts: on the mitigation of and also on the adaptation to climate change. The adaptation part of the NCCS describes and accepts the importance of ecosystem services.

The main objective of the actions proposed in relation to natural flora and fauna and nature conservation in the adaptation part of the NCCS is to maintain or possibly enhance the inherent adaptation capacity of biodiversity. The main opportunity for mitigating the harmful effects of climate change is the improvement of the adaptation capacity of the habitats to climate change. Therefore, the tasks to be completed are divided into two main groups:

1. Tasks to be completed in order to promote local adaptation, to preserve and increase the existing biodiversity and maintain and improve the naturalness thereof (also in non-protected areas):

- *Nature conservation*: elaborating the priority lists of habitats and species considered as sensitive to the climate change; preserving and regenerating the biological (landscape, species, genetic etc.) diversity; restoring the water retaining capacity of aquatic habitats and developing the possible means for ensuring extra water supply; implementing or continuing the necessary habitat reconstruction projects; preserving the heterogeneity, mosaic-like character and different successive stages of the habitats; introducing approaches that reduce the increasing risk of invasion, strengthening the monitoring activities in order to track the processes.
- *Water management*: eliminating the necessity of water drainage; operating the reservoirs in accordance with the ecological considerations; revising the system of water rights authorisation (soil and deep groundwater uses); implementing the complex water management system specified by the Water Framework Directive in accordance with the ecological regulations and nature conservation considerations.
- *Forest management*: wider application of forest management practices based on natural processes, maintaining a contiguous forest coverage, applying natural forest renovation methods, converting forests which are inappropriate to the habitat and/or have non-native species, maintaining the park forests with lower closure in the forest-steppe zone, preserving the landscape, habitat, species, successional, genetic etc. diversity of forests and the natural processes and natural values of forests as much as possible; creating buffer areas in the vicinity of sensitive habitats.

- *Agriculture*: preserving or revitalising the elements of traditional landscape management (lawn mowing and grazing); creating buffer area in the vicinity of sensitive habitats and – especially in these areas but possibly everywhere – shifting towards less intensive farming methods that cause lower environmental burden; land use changes.

2. Tasks to be completed in order to enhance the intercommunication through the landscape surrounding natural areas and to facilitate the migration of species (measures mostly related to areas currently without protection):

- *Nature conservation*: ensuring migration between the areas having natural flora and fauna; evaluating the areas with various protection status and the National Ecological Network in terms of climate change considerations, identifying the conflict points; developing the nature conservation areas and Natura 2000 areas and regular revision of the boundaries thereof in line with the movements of species and biocenoses.
- *Water management*: water management in accordance with the recommendations of the EU Water Framework Directive and taking ecological considerations into account; restoring the water retaining capacity of aquatic habitats, and developing the possible means for ensuring extra water supply. The water supply and water levels should follow their natural course as closely as possible and areas that were originally exposed to water coverage or currently affected by inland inundation should be given back to nature in accordance with the relevant sections of the New Vásárhelyi Plan. Water management in floodplains should follow the natural course as much as possible (e.g., water level management); review of the drainage systems; increasing the size of aquatic habitats.
- *Forest management*: separating the regulation related to natural-like forests and tree plantations; applying the conclusions of climate change-related forestry research studies in forest renovation; disseminating management methods that are based on natural processes and ensure a contiguous forest coverage (according to the Pro Silva principles), reducing the size of areas where clear-felling can be authorised; establishing large scale forest plantations possibly using native tree species that are appropriate to the habitat, developing a system of field-protection forest belts, increasing the area of grazing lands with trees both in the existing forest zone and in the forest-steppe areas of the Great Plain.
- *Agriculture*: increasing the heterogeneity and mosaic-like character (balks, hedges, alleys, small land parcel sizes) of the agricultural landscape; applying soil and water saving technologies; prioritising extensive and ecological farming methods.
- *Transport*: incorporating nature conservation considerations into road track planning, enhanced application of the relevant rules in force; creating ecological corridors (corridors for wild animals) across main roads and motorways and planting hedges and forests of native species along their edges.

Horizontal tasks include among others the following:

- considering biodiversity aspects in the sectoral regulations and support schemes;
- integrating biodiversity conservation into the regional regulation plans and authorisation schemes and into the system of means to be elaborated to ensure sustainable use.

Biodiversity conservation is also highlighted in the “Agriculture and forestry” chapter of the “Adaptation” part of the NCCS.

Hungary does not have a separate, approved **Strategy to Combat Desertification**, but the National Climate Change Strategy includes chapters and measures that relates to combating droughts. The chapters on water management and agriculture of the "Adaptation" part of the NCCS sets the aims to be prepared for floods and drought periods.

Impact assessments

The relevant regulatory instruments require, on the first hand, the environmental assessment of plans and programmes, and on the other hand, the impact assessment of a wide range of projects. According to the main Natura 2000 legislation on nature conservation areas of European Community importance, any plan or project in Hungary must undergo prior assessment if it is likely to have negative effects on a Natura 2000 site.

Case-study: Supporting business for biodiversity

Biodiversity business opportunities exist across a range of sectors from specific agricultural practices, to ecotourism or sustainable forestry. Companies that make use of natural resources are mostly micro, small and medium-sized enterprises. Markets can work for biodiversity and sustainable use of resources and, if properly managed by public policy, remain a good mechanism for managing scarce resources and improving livelihoods. The challenge of long-term biodiversity conservation is one that would benefit from the active involvement of the business and banking community.

The 'Biodiversity Technical Assistance Units' pilot project aims to create instruments in selected countries – Hungary, Bulgaria and Poland – that apply a public-private partnership approach in exploring business opportunities for safeguarding biodiversity. These instruments - 'Biodiversity Technical Assistance Units' - aim to achieve followings:

- to facilitate the creation of a new pro-biodiversity investment market for the business and banking sector;
- to deliver a pipeline of bankable projects for future investment loans for the benefit of biodiversity.

The Units create and apply a public-private partnership approach to exploring business opportunities for safeguarding biodiversity by linking commercial loan funding with public subsidies to produce long-term, site and region-specific economic and nature benefits. The project began in January 2007 and runs for three years. The project explores the specific links between small and medium sized enterprises (SMEs), social and economic development in rural areas, and the protection of biodiversity. It highlights the opportunities and constraints faced by SMEs in managing biodiversity in a sustainable way, while achieving commercial viability. The project focuses on those areas of nature that have been recognised as high value and that are included in the Natura 2000 network, these include the large majority of Important Bird Areas as defined under the EU Habitats and Birds Directives.

Other convention processes

Hungary actively participates in various processes taking place under the auspices of the UN (for example, Rio process and pan-European environmental co-operation). Hungary has ratified several **international and regional conventions and agreements relevant to biodiversity conservation**, the most important of which are listed below. Dates are shown in brackets in case of those conventions that have been promulgated since 2004.

- Agreement on the Conservation of Populations of European Bats (Eurobats)
- Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA)
- Cartagena Protocol on Biosafety (2004)
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- Convention on Migratory Species (CMS)
- Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention)
- Convention on Co-operation for the Protection and Sustainable Use of the River Danube (Danube River Protection Convention)
- Convention on the Protection and Sustainable Development of the Carpathians (Carpathian Convention) (2004)
- Convention on the Protection and Use of Transboundary Watercourses and International Lakes (2004)
- Convention on Wetlands (Ramsar Convention)
- European Landscape Convention (2007)
- International Convention for the Regulation of Whaling
- International Plant Protection Convention (IPPC)
- International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA)
- Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (2006)
- Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention)
- United Nations Framework Convention on Climate Change (UNFCCC)
- United Nations Convention to Combat Desertification (UNCCD)
- World Heritage Convention

Hungary has **sub-regional cooperation** with the other three countries of the Visegrád group (Visegrád group includes Hungary, Czech Republic, Poland and Slovakia), field of cooperation include the followings: biodiversity conservation, the Pan-European Ecological Network, cooperation about the Natura 2000 network and the Carpathian Convention. Under the Carpathian Convention Hungary actively participated in the development of the Protocol on Conservation of Biological and Landscape Diversity.

In the field of biodiversity conservation, **bilateral cooperation** exists with several countries. High-level bilateral memoranda of understanding are signed and other on-going cooperation exist for nature conservation on regional level through neighbouring national park directorates and other nature conservation agencies. Hungary cooperates with neighbouring countries concerning protected sites for instance through the transfer of experience on the establishment and management of the Ramsar protected sites, World Heritage sites,

transboundary ecological network, protected caves, Natura 2000 network or other activities in relation to the transboundary ecotourism, wetland restoration, integrated international EU projects and other co-partnership programmes. Concrete cooperation activities include the following:

- with Austria – cooperation between the transboundary national parks (Fertő-Hanság National Park – Neusiedler See-Seewinckel National Park); common grassland management system; establishment of visitors centre; wetland reconstructions;
- with Croatia – preparation of the transboundary Danube-Drava.-Mura Biosphere Reserve
- with Romania – activities related to the Natura 2000 network, harmonized monitoring activity regarding some protected bird species, joint projects (e.g.: Conservation of Falco vespertinus in the Pannonian region)
- with Slovakia – common map of ecological network; cooperation regarding Natura 2000 sites and certain species conservation action plans; establishment of transboundary Ramsar site; joint conservation actions at the World Heritage Site at the Aggtelek National Park – Slovak Karst; several joint publications, films and exhibitions, nature conservation dictionary in Hungarian-Slovak-English
- Slovenia – cooperation between transboundary protected areas (Őrség-Raab-Goricko naturpark)
-

Successful cooperation with neighbouring countries exists concerning the following EU LIFE-Nature and LIFE+ programmes:

- Funding the base of long term large carnivore conservation in Hungary;
- Conservation of *Aquila heliaca* in the Carpathian basin;
- Conservation of *Falco cherrug* in the Carpathian basin;
- Conservation of *Vipera ursinii rakosiensis* in the Carpathian basin and
- Conservation of *Falco vespertinus* in the Pannonian region.

The so-called Visegrád Group is the cooperation among four countries in the Central European region (Hungary, Czech Republic, Slovakia and Poland) in a number of fields of common interest, including environment. Several joint projects have been carried out in the field of environment protection and nature conservation. Following the general guidelines on the development of the Pan-European Ecological Network the “Visegrád 4 countries” with Croatia and Ukraine worked together on a common Ecological Network Mapping Project.

In Hungary the Ministry of Environment and Water and four NGOs are members of the International Union for Conservation of Nature and Natural Resources (IUCN) and in 2003 the IUCN National Committee was established.

Chapter IV - Conclusions: Progress Towards the 2010 Target and Implementation of the Strategic Plan

The below table shows the status of indicators to assess progress towards the 2010 Biodiversity Target at national level in Hungary:

Goals and targets	Relevant indicators	Status in Hungary
Protect the components of biodiversity		
Goal 1. Promote the conservation of the biological diversity of ecosystems, habitats and biomes		
Target 1.1: At least 10% of each of the world's ecological regions effectively conserved. Target 1.2: Areas of particular importance to biodiversity protected	-Coverage of protected areas -Trends in extent of selected biomes, ecosystems and habitats -Trends in abundance and distribution of selected species	-In use, value in Hungary is 22%. -In use, habitats protected by the European Union's Habitats Directive are monitored. -In use, species are monitored within the Hungarian Biodiversity Monitoring System; species of European interest are monitored.
Goal 2. Promote the conservation of species diversity		
Target 2.1: Restore, maintain, or reduce the decline of populations of species of selected taxonomic groups.	-Trends in abundance and distribution of selected species -Change in status of threatened species	-See target 1.1. -In use for species of European interest.
Target 2.2: Status of threatened species improved.	-Change in status of threatened species -Trends in abundance and distribution of selected species -Coverage of protected areas	-See Target 1.1, 1.2. and 2.1.
Goal 3. Promote the conservation of genetic diversity		

Goals and targets	Relevant indicators	Status in Hungary
Target 3.1: Genetic diversity of crops, livestock, and of harvested species of trees, fish and wildlife and other valuable species conserved, and associated indigenous and local knowledge maintained.	-Trends in genetic diversity of domesticated animals, cultivated plants, and fish species of major socio-economic importance -Trends in abundance and distribution of selected species	-In use, changes in the number of registered taxa and cultivars in Hungary. -In use, trends in abundance of common farmland birds are monitored.
Promote sustainable use		
Goal 4. Promote sustainable use and consumption.		
Target 4.1: Biodiversity-based products derived from sources that are sustainably managed, and production areas managed consistent with the conservation of biodiversity.	-Area of forest, agricultural and aquaculture ecosystems under sustainable management -Trends in abundance and distribution of selected species -Marine trophic index -Nitrogen deposition -Water quality in aquatic ecosystems	- In use, the area of organic farming, the area. -Not in use. -There is no coastal area in Hungary. -Not in use. -In use, water quality of rivers and big lakes is monitored.
Target 4.2. Unsustainable consumption, of biological resources, or that impacts upon biodiversity, reduced.	-Ecological footprint and related concepts	-Ecological footprint: according to www.footprintnetwork.org the country's per capita average footprint is 3.5 ha.
Target 4.3: No species of wild flora or fauna endangered by international trade.	-Change in status of threatened species	-In use.
Address threats to biodiversity		
Goal 5. Pressures from habitat loss, land use change and degradation, and unsustainable water use, reduced.		

Goals and targets	Relevant indicators	Status in Hungary
Target 5.1. Rate of loss and degradation of natural habitats decreased.	-Trends in extent of selected biomes, ecosystems and habitats -Trends in abundance and distribution of selected species -Marine trophic index	-In use, selected habitats are monitored within the Hungarian Biodiversity Monitoring System; habitats protected by EU Habitats Directive are monitored - In use, species are monitored within the Hungarian Biodiversity Monitoring System, species of European interest are monitored. -There is no seacoast in Hungary.
Goal 6. Control threats from invasive alien species		
Target 6.1. Pathways for major potential alien invasive species controlled.	-Trends in invasive alien species	-Not in use.
Target 6.2. Management plans in place for major alien species that threaten ecosystems, habitats or species.	-Trends in invasive alien species	-Not in use.
Goal 7. Address challenges to biodiversity from climate change, and pollution		
Target 7.1. Maintain and enhance resilience of the components of biodiversity to adapt to climate change.	-Connectivity/fragmentation of ecosystems	-Not in use
Target 7.2. Reduce pollution and its impacts on biodiversity.	-Nitrogen deposition -Water quality in aquatic ecosystems	- Not in use -In use, water quality of rivers and big lakes are monitored.
Maintain goods and services from biodiversity to support human well-being		
Goal 8. Maintain capacity of ecosystems to deliver goods and services and support livelihoods		
Target 8.1. Capacity of ecosystems to	-Water quality in aquatic ecosystems	-In use, water quality of rivers and big lakes are

Goals and targets	Relevant indicators	Status in Hungary
deliver goods and services maintained.	-Marine trophic index -Incidence of Human-induced ecosystem failure	monitored. -There is no marine/ coastal area in Hungary. -Not in use
Target 8.2. Biological resources that support sustainable livelihoods, local food security and health care, especially of poor people maintained.	-Health and well-being of communities who depend directly on local ecosystem goods and services -Biodiversity used in food and medicine	-Not in use -Not in use
Protect traditional knowledge, innovations and practices		
Goal 9 Maintain socio-cultural diversity of indigenous and local communities		
Target 9.1. Protect traditional knowledge, innovations and practices.	-Status and trends of linguistic diversity and numbers of speakers of indigenous languages	-Not in use
Target 9.2. Protect the rights of indigenous and local communities over their traditional knowledge, innovations and practices, including their rights to benefit-sharing.	Indicator to be developed	-Not in use
Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources		
Goal 10. Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources		
Target 10.1. All access to genetic resources is in line with the Convention on Biological Diversity and its relevant provisions.	Indicator to be developed	-Not in use

Goals and targets	Relevant indicators	Status in Hungary
Target 10.2. Benefits arising from the commercial and other utilization of genetic resources shared in a fair and equitable way with the countries providing such resources in line with the Convention on Biological Diversity and its relevant provisions	Indicator to be developed	-Not in use
Ensure provision of adequate resources		
Goal 11: Parties have improved financial, human, scientific, technical and technological capacity to implement the Convention		
Target 11.1. New and additional financial resources are transferred to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with Article 20.	-Official development assistance provided in support of the Convention	-Not in use
Target 11.2. Technology is transferred to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with its Article 20, paragraph 4.	Indicator to be developed	-Not in use

In order to turn the 2010 target into concrete national action, the Hungarian Ministry of Environment and Water joined the IUCN's Countdown 2010 programme and thus committed itself to specific activities in the following areas:

- enhancing its network of designated sites,
- complying with EU legislation and international conventions,
- strengthening financial and legislative capacities for nature conservation,
- raising public awareness, and,
- improving management of sites and species.

Appendix III shows the progress towards targets of the Global Strategy for Plant Conservation.

Appendix I - Information concerning reporting Party and preparation of national report

Reporting Party

Contracting Party	Republic of Hungary
National focal point	
Full name of the institution	Ministry of Environment and Water
Name and title of contact officer	Dr Katalin RODICS, Head of Unit
Mailing address	Fő utca 44-50, Budapest H-1011, Hungary
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Contact officer for national report (if different FROM ABOVE)	
Full name of the institution	Ministry of Environment and Water
Name and title of contact officer	Ditta GREGUSS, counsellor
Mailing address	Fő utca 44-50, Budapest H-1011, Hungary
Telephone	+36-1-457-3555
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E-mail	greguss@mail.kvvm.hu
Submission	
Signature of officer responsible for submitting national report	Dr György ERDEY, State Secretary, Ministry of Environment and Water
Date of submission	'28' May 2009

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Process of preparation of national report

The draft of the fourth National Report was prepared by the Biodiversity Unit of the Ministry of Environment and Water with the coordination of the National Focal Point to the CBD.

During the preparation phase, several reports have been reviewed, for instance national reports to biodiversity-related international conventions and organizations, reports about the implementation of national programmes (e.g. National Environmental Programmes) as well as reports prepared due to Hungary's obligations to the European Union. Moreover, sectoral plans and programmes and scientific literature served another basis of the fourth National Report. During the drafting phase, information was gathered through consultations with relevant experts from the Ministry of Environment and Water and other institutions.

After the compilation of the inputs, departments of other ministries, scientific and research institutions and relevant experts were contacted to provide supplementary information and/or to review and complement the relevant parts of the National Report. The final draft of the report was reviewed by the State Secretariat for Nature and Environment Protection of the Ministry of Environment and Water.

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Appendix III - Progress towards Targets of the Global Strategy for Plant Conservation and Programme of Work on Protected Areas

Progress towards targets of the Global Strategy for Plant conservation

Target 1: *A widely accessible working list of known plant species, as a step towards a complete world flora*

2 860 known plant species occur in Hungary. Their taxonomy and plant geography have been described in several publication, e.g. in the six volumes written by Soó (1964–80).

No comprehensive list of plant species is available on the Internet, however the list of the 720 protected species is online at several sites, including the official website of nature conservation (http://www.termeszetvedelem.hu/).

Target 2: *A preliminary assessment of the conservation status of all known plant species, at national, regional and international levels*

The conservation status of the Hungarian flora is regularly assessed in order to support conservation decision making. A Red list of the vascular flora of Hungary was compiled in 2007.

Status of 46 plant taxa of European importance is monitored in detail; their last assessment was carried out in 2008. 101 plant species are monitored in the Hungarian Biodiversity Monitoring System.

Target 3: *Development of models with protocols for plant conservation and sustainable use, based on research and practical experience*

Action plans for the following 20 plant species have been approved by the Minister of Environment and Water: *Adonis x hybrida, Aldrovanda vesiculosa, Angelica palustris, Bulbocodium vernum, Buxbaumia viridis, Crambe tataria, Cypripedium calceolus, Salvia nutans, Dianthus diutinus, Dicranum viride, Dracocephalum austriacum, Ferula sadleriana, Gladiolus palustris, Liparis loeselii, Nepeta parviflora, Onosma tornense, Paeonia banatica, Pulsatilla patens, Pulsatilla pratensis subsp. hungarica, Pyramidula tetragona*. An action plan for *Trapa natans* is under development.

Target 4: *At least 10 per cent of each of the world's ecological regions effectively conserved*

One of the objectives of the second National Environmental Programme (2003-2008) was “to continue the establishment of a network of protected areas”. At present, 22% of the country’s area is protected either by national and/or European Union legislation. The Pannonian biogeographical region is one of Europe's ecoregions. Its largest part belongs to Hungary.

Target 5: *Protection of 50 per cent of the most important areas for plant diversity assured*

The most important areas for plant diversity are protected in Hungary – this fact is visible when comparing Figure 1. with Figure 2. Sites included in the Natura 2000 network (European Union`s ecological network) have been selected on the basis of the occurrence of important plant species.

Target 6: *At least 30 per cent of production lands managed consistent with the conservation of plant diversity*

In 2007, the area of organic farming covered 122,270 hectares (2,1% of agriculture area).

73,000 hectares of grasslands are included in the Natura 2000 network (73% of the total grassland area).

The national agri-environmental programme subsidies extra performance associated with environmentally-aware farming, sustainable landscape management and animal welfare investments, and reimburse income losses resulting from these activities. The programme allows only a limited level of chemical use in participating sites. About 15% of the country's agricultural area is involved in the programme, however the real impact of the programme on biodiversity is not assessed yet.

Within this area, concrete measures consistent with biodiversity conservation were implemented on 120,000 hectares of Environmentally Sensitive Areas

Regarding forest areas, in 2007 47,546 hectares of forests were considered to have non-timber production function. In 2008, 251,906 hectares were involved (13,3% of the forested area) in the Forest Stewardship Council system

Target 7: *60 per cent of the world's threatened species conserved in situ.*

The preservation of endangered species populations is a priority second National Environmental Programme (2003-2008). 69% of the species listed as somehow endangered on the Hungarian Red list are protected by national law.

Target 8: *60 per cent of threatened plant species in accessible ex situ collections, preferably in the country of origin, and 10 per cent of them included in recovery and restoration programmes*

Botanical gardens play an important role in implementation of this objective.

Target 9: *70 per cent of the genetic diversity of crops and other major socio-economically valuable plant species conserved, and associated indigenous and local knowledge maintained*

For detailed information, see the "Agricultural ecosystems" section of this report.

Target 10: *Management plans in place for at least 100 major alien species that threaten plants, plant communities and associated habitats and ecosystems*

In 2004 and 2006 the Ministry of Environment and Water published two books titled 'Biological Invasions in Hungary. Invasive Plants', which include experiences regarding management measures of national park directorates. In 2008 the Institute of Ecology and Botany published the book titled 'The most important invasive plants in Hungary'.

Work is underway in the Ministry of Environment and Water to implement the European Strategy on Invasive Alien Species: research and management experiences are brought together and systematized to lay a foundation for the Hungarian strategy.

Target 11: *No species of wild flora endangered by international trade*

In the past, numerous species (e.g. *Adonis vernalis, Galanthus nivalis, Ruscus aculeatus, Pulsatilla grandis, Orchidaceae*) used to be threatened by international trade, but it has changed since Hungary joined CITES and declared protected the species concerned. Therefore, at present international trade does not represent a major threat. The list of protected species is updated regularly, thus if any new species are considered to be threatened by trade, Hungary will react immediately.

Target 12: *30 percent of plant-based products derived from sources that are sustainably managed*

No information is available beyond those mentioned under Target 6.

Target 13: *The decline of plant resources, and associated indigenous and local knowledge innovations and practices, that support sustainable livelihoods, local food security and health care, halted.*

The number of plant varieties and landraces stored in gene banks has increased. For instance, accessions of field and vegetable crops stored at the main crop gene bank of Hungary (RCAT) have doubled between 1996 and 2007. The RCAT has always paid special attention to the collection and maintenance of native landraces of field and vegetable crops. A back-yard multiplication system was developed and used for the isoclimatic regeneration of land races near the places of their collecting sites, which supports local food security.

However, due to the domination of a few varieties, less traditional fruit and vegetable landraces can be found at supermarkets/markets.

Target 14: *The importance of plant diversity and the need for its conservation incorporated into communication, education and public awareness programmes.*

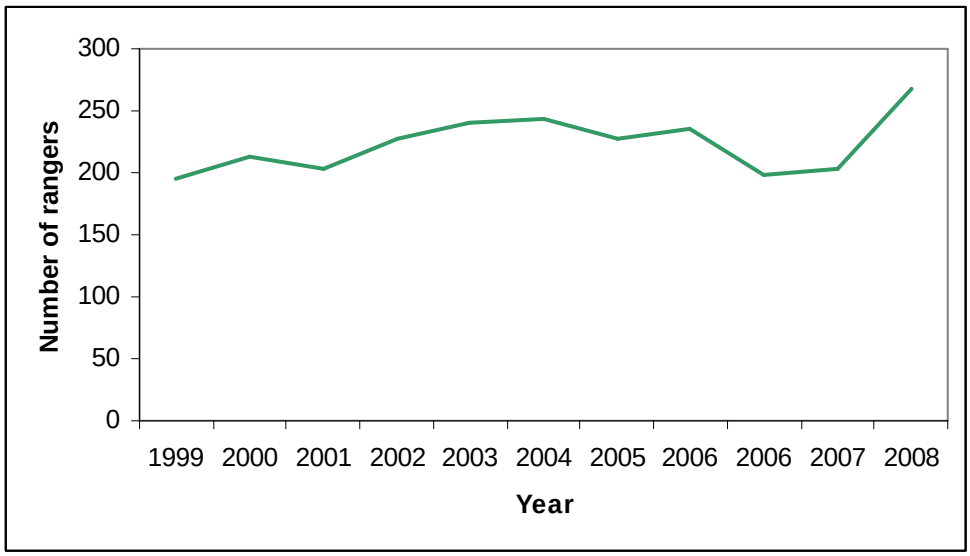
The topic is treated in the `Tourism and Education` sections of the report.

Gene banks and botanical gardens play an important role in education activities related to plant diversity.

Target 15: *The number of trained people working with appropriate facilities in plant conservation increased, according to national needs, to achieve the targets of this Strategy.*

No exact numbers for staff involved in plant conservation, but the number of rangers in National Parks can be informative. Their number has increased from 195 in 1999 to 267 in 2008 (Figure 24.).

Figure 24. *Changes in the number of rangers working for National Parks in Hungary between 1999-2008. Source: Hungarian Ministry of Environment and Water.*



Target 16: *Networks for plant conservation activities established or strengthened at national, regional and international levels*

The MÉTA program is an initiative with the main goal of mapping and scientifically assessing the present status of Hungarian flora. Another aim is to help the collaboration between botanists, researchers in related branches of knowledge, conservation experts and involved social groups.

The Association of Hungarian Arboreta and Botanical Gardens (MABOSZ) includes all the Hungarian arboreta, botanical gardens and plant collections belonging to various government offices, local authorities or private owners.

Progress towards targets of the Programme Work on Protected Areas

A thematic report on the **Programme of Work on Protected Areas** was submitted in June 2007. Updated information on protected areas in Hungary can be found in the main body of the present report.

Appendix IV - Abbreviations used in the report

AEWA	Agreement on the Conservation of African-Eurasian Migratory Waterbirds
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on Migratory Species
EAFRD	European Agricultural Fund for Rural Development
EEOP	Environment and Energy Operational Programme
ESA	Environmentally Sensitive Area
EU	European Union
Eurobats	Agreement on the Conservation of Populations of European Bats
HAS	Hungarian Academy of Sciences
HBMS	Hungarian Biodiversity Monitoring System
HEP	Hungarian Energy Policy
ITPGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture
IUCN	International Union for Conservation of Nature and Natural Resources
IPPC	International Plant Protection Convention
MA	Millennium Ecosystem Assessment
MARD	Ministry of Agriculture and Rural Development
MEC	Ministry of Education and Culture
MEC	Ministry of Education and Culture
MEW	Ministry of Environment and Water
MME	Hungarian Ornithological and Nature Conservation Society
NAEP	National Agri-Environmental Programme
NBmR	Hungarian Biodiversity Monitoring System
NBSAP	National Biodiversity Strategy and Action Plan
NCCS	National Climate Change Strategy
NCI	Natural Capital Index
NEDS	National Ecotourism Development Strategy
NEP	National Environmental Programme
NFP	National Forest Programme
NHDP	New Hungary Development Plan
NHRDP	New Hungary Rural Development Programme
NHRDP	New Hungary Rural Development Plan
NNCMP	National Nature Conservation Master Plan
NRDP	National Rural Development Plan
NSDS	National Sustainable Development Strategy

NSP	National Spatial Plan
NTDS	National Tourism Development Strategy
RCAT	Research Centre for Agrobotany at Tápiószele
SMEs	small and medium sized enterprises
UNCCD	United Nations Convention to Combat Desertification
UNFCCC	United Nations Framework Convention on Climate Change