

**CONSERVATION OF BIODIVERSITY NATIONAL
STRATEGY AND ACTION PLAN
Objectives, policies and actions**

Adopted by the Ministry of Environment and Water

TABLE OF CONTENTS

I. CONSERVATION OF BIODIVERSITY - NATIONAL STRATEGY AND ACTION PLAN FRAMEWORK	5
REQUIREMENTS FOR THE STRATEGY	5
STRATEGY OBJECTIVES	6
<i>Strategic objective 1: Conservation and improvement of the status of protected natural areas</i>	<i>6</i>
<i>Strategic objective 2: Conservation and development of biodiversity outside protected natural areas</i>	<i>8</i>
<i>Strategic objective 3: Strengthening ex-situ conservation</i>	<i>10</i>
<i>Strategic objective 4: Sustainable use of biodiversity and its components, and putting in place the instruments and tools required for sustainable use</i>	<i>11</i>
<i>Strategic objective 5: Development of social awareness, required for the conservation and enhancement of biodiversity: education, training and information</i>	<i>13</i>
<i>Strategic objective 6: Fair and equitable sharing of benefits arising out of the utilisation of genetic resources</i>	<i>15</i>
<i>Strategic objective 7: Integration of biodiversity conservation considerations into sectors, sectoral strategies, regional, micro-regional and local plans and programmes</i>	<i>16</i>
II. MINING	17
INTRODUCTION	17
STRATEGY	20
<i>Objectives according to phases of mining activities</i>	<i>20</i>
ACTION PLAN	21
INSTITUTIONS INVOLVED IN THE IMPLEMENTATION OF TASKS IDENTIFIED IN THE ACTION PLAN	24
III. FORESTRY AND FOREST MANAGEMENT	25
INTRODUCTION	25
STRATEGY	26
<i>Objective: Introduction of silviculture and forest management based on natural processes</i>	<i>26</i>
<i>Objective: Strengthening of nature conservation planning and its co-ordination in forest land areas</i>	<i>27</i>
<i>Objective: Nature conservation research in forest land areas</i>	<i>28</i>
<i>Objective: Development of a monitoring system observing the conditions of forests and changes in those conditions</i>	<i>28</i>
<i>Objective: Conservation and conservation management and renewal of forest-steppe forests</i>	<i>28</i>
<i>Objective: Conservation, semi-natural management and renewal of forests in wetland habitats (floodplains, marshes)</i>	<i>29</i>
<i>Objective: Conservation and restoration of protective forests</i>	<i>29</i>
<i>Objective: Development of ecological network in forest land areas</i>	<i>30</i>
<i>Objective: Introduction of a forest financing system recognising the public services of forests at the level of society</i>	<i>30</i>
<i>Objective: Ownership status of forests, asset management in state-owned forests</i>	<i>31</i>
<i>Objective: Increase of forest land areas with afforestation and tree planting</i>	<i>31</i>
<i>Objective: Development of a forestry communication strategy in biodiversity conservation</i>	<i>32</i>
<i>Objective: Maintenance of big game stock, which does not endanger the protected natural assets and natural processes of forests</i>	<i>32</i>
ACTION PLAN	33
INSTITUTIONS INVOLVED IN THE IMPLEMENTATION OF TASKS IDENTIFIED IN THE ACTION PLAN	36
IV. FISHERIES MANAGEMENT, FISHING, ANGLING	37
INTRODUCTION	37
STRATEGY	38
ACTION PLAN	40
INSTITUTIONS CONCERNED WITH THE IMPLEMENTATION OF THE TASKS IDENTIFIED IN THE ACTION PLAN	41
V. AGRICULTURE	42

INTRODUCTION.....	42
STRATEGY	42
<i>Objective: Making the environmentally sustainable agro-environmental management general</i>	42
<i>Objective: Improvement of the landscape and land use systems</i>	44
<i>Objective: Development and dissemination of farming methods and production area models protecting biodiversity</i>	46
<i>Objective: Changing arable crop production and crop system to improve biodiversity</i>	46
<i>Objective: Development of horticultural plant production with a focus to enhancing biodiversity</i>	47
<i>Objective: Developing animal husbandry with a focus to maintain biodiversity</i>	47
<i>Objective: Mitigation of the impacts of human intervention and droughts, floods and inland waters on biodiversity</i>	47
<i>Objective: Conserving the biodiversity of the Natura 2000 sites through the agricultural support system</i>	48
<i>Objective: Change of direction in agricultural research and development</i>	48
<i>Objective: Encouraging a change of direction in economic policy</i>	48
ACTION PLAN	49
INSTITUTIONS CONCERNED WITH THE IMPLEMENTATION OF THE TASKS IDENTIFIED IN THE ACTION PLAN	50
VI. REGIONAL DEVELOPMENT AND TOURISM.....	51
INTRODUCTION.....	51
STRATEGY	51
<i>Objective: Regional development</i>	51
<i>Objective: Tourism</i>	52
<i>Objective: Joint tasks of regional development and tourism</i>	54
ACTION PLAN	55
INSTITUTIONS CONCERNED WITH THE IMPLEMENTATION OF THE TASKS IDENTIFIED IN THE ACTION PLAN	56
VII. LAND USE.....	57
INTRODUCTION.....	57
STRATEGY	58
<i>Objective: Harmonisation of interests</i>	59
<i>Objective: Generating motivation</i>	60
ACTION PLAN	60
INSTITUTIONS CONCERNED WITH THE IMPLEMENTATION OF THE TASKS IDENTIFIED IN THE ACTION PLAN	62
VIII. HUNTING.....	63
INTRODUCTION.....	63
STRATEGY	65
<i>Objective: Maintaining an appropriate game stock</i>	65
<i>Objective: Game management planning and implementation of sustainable game management</i>	66
ACTION PLAN	67
INSTITUTIONS CONCERNED WITH THE IMPLEMENTATION OF THE TASKS IDENTIFIED IN THE ACTION PLAN	68
IX. WATER MANAGEMENT.....	69
INTRODUCTION.....	69
STRATEGY	71
ACTION PLAN	72
INSTITUTIONS CONCERNED WITH THE IMPLEMENTATION OF THE TASKS IDENTIFIED IN THE ACTION PLAN	75
X. MOLECULAR BIOLOGY METHODS AND BIODIVERSITY.....	76
STRATEGY	78
ACTION PLAN	79
INSTITUTIONS CONCERNED WITH THE IMPLEMENTATION OF THE TASKS IDENTIFIED IN THE ACTION PLAN	80

XI. APPENDICES	81
XI/1. HUNGARIAN REGULATIONS DIRECTLY DETERMINING AND INFLUENCING THE CONSERVATION AND SUSTAINABLE USE OF BIODIVERSITY AND THE CONSERVATION OF NATURE (LAWS, CONCEPTS, PROGRAMMES)	81
EUROPEAN UNION AND PAN-EUROPEAN DOCUMENTS RELATED TO BIODIVERSITY CONSERVATION	82
DOMESTIC NON-GOVERNMENTAL STRATEGIES USED	82
XI/2. KEY FINDINGS OF THE SWOT ANALYSIS (EXPLORING STRENGTHS, WEAKNESSES, OPPORTUNITIES AND THREATS) THAT SERVES AS THE BASIS OF THE STRATEGY	83
<i>Strengths in the field of biodiversity conservation.....</i>	<i>83</i>
<i>Weaknesses in biodiversity conservation.....</i>	<i>84</i>
<i>Possibilities for biodiversity conservation.....</i>	<i>85</i>
<i>Factors and processes threatening biodiversity conservation.....</i>	<i>85</i>

I. CONSERVATION OF BIODIVERSITY - NATIONAL STRATEGY AND ACTION PLAN FRAMEWORK

The flora and fauna of the Carpathian Basin is extremely rich, and therefore this region is very important in terms of conservation of biodiversity of the Earth too. The basin is surrounded by mountains on all sides, which reduce and filter the external environmental impacts and, as a result of their isolation effect, the living beings and their communities established in the basin form a special evolution unit. The Carpathian Basin is situated at the junction of the deciduous forest zone and the continental forest-steppe zone. This is a breakpoint of large-scale zonality, typical of Eastern Europe, and the variety of individual landscapes begins to dominate. Hungary's situation in the Carpathian Basin leads to a special bio-regional unit – Pannon region – and it also enables the continuity of a close relationship with the surrounding biogeographical regions. The characteristic features of the Pannon region are the variety of climates and rocks, resulted in the development of a unique flora and fauna. Continental, sub-Mediterranean and alpine climatic effects jointly form the environmental conditions of flora and fauna characteristic of the particular region.

While developing the National Strategy and Action Plan for the Conservation of Biodiversity (hereinafter: Strategy), we had to take into account all previous international agreements, strategies and programmes in which Hungary is a contracting party, the Hungarian legal regulations and all other governmental and non-government efforts that preceded and formed the basis of the current Strategy (see Annexes). Following Hungary's accession to the European Union, the environmental policy of the European Union, and the EU Biodiversity Strategy and Action Plans are the documents of fundamental importance.

REQUIREMENTS FOR THE STRATEGY

- The Strategy should combine all efforts specified in the Convention on Biological Diversity (hereinafter: Convention) as well as other treaties, strategies and plans that partially overlap with each other.
- The Strategy should apply an integrated approach.
- The Strategy must underline the importance of prevention of harmful effects.
- The Strategy must aim at the entire society.
- The Strategy must create a balance between economic interests and biodiversity conservation.
- The Strategy should promote the objective of the Gothenburg Council of the European Union, which aims at the protection and restoration of habitats and natural systems, as well as halting the loss of biodiversity by 2010.

Future vision contained in the strategy

- The Strategy outlines a future vision planned for 2010, and implemented by 2030. Providing it is feasible, in accordance with the objectives of the European Union, by 2010 the loss of biodiversity will come to a halt and the long-term favourable impacts of the current stabilisation measures will lead to positive results by 2030. This requires the integration of biodiversity conservation as a priority into comprehensive policies and programmes (e.g. Europe Plan) as well as among the objectives of the key sectors, such as, for example, the policies and programmes of those sectors that have a key role in terms

of protection and sustainable use of natural resources: agriculture, forestry, fisheries, spatial planning, infrastructure development (energy, transport), industry, tourism, economy and development, international trade.

For example:

- By 2010, the proportion of natural and semi-natural areas must not be reduced any further.
- Preservation of the system and good ecological conditions of Natura 2000 sites.
- Under the Water Framework Directive, good ecological status of waters must be achieved by 2015.
- Nature conservation criteria, such as, for example, extension, adequate management and use of flood plains must be integrated into flood protection measures for the protection of waters and wetland habitats.
- The triple zone distribution of the country will be achieved in terms of land use, according to which nature conservation, extensive and intensive agricultural zones should form a harmonised system in land use satisfying the ecological and agro-ecological potential of the particular habitats.

STRATEGY OBJECTIVES

The main objective of the Strategy is to conserve, stabilise and if possible improve the biodiversity status of the country on a medium-term basis, and to provide opportunities for processes, favourable in terms of biodiversity conservation on a long-term basis. The most important objectives of the Strategy are the following:

1. Conservation and improvement of the status of protected natural areas.
2. Conservation and improvement of biodiversity outside protected natural areas.
3. Strengthening ex-situ conservation.
4. Sustainable use of biodiversity and its components, and putting in place instruments and tools required for sustainable use.
5. Development of social awareness, required for the conservation and enhancement of biodiversity: education, training and information.
6. Fair and equitable sharing of benefits arising out of the utilization of genetic resources.
7. Integration of biodiversity conservation considerations into sectors, sectoral strategies, regional, micro-regional and local plans and programmes.
8. Creating the conditions for the economic valuation of biodiversity.

Strategic objective 1: Conservation and improvement of the status of protected natural areas

Strategic considerations

1. In order to preserve biodiversity, the conditions of conservation of natural habitats, communities, populations of species living there must be given priority over short-term economic interests.
2. Each plan or programme that may have a significant impact on protected natural areas must contain a preliminary impact assessment even if the plan or programme will be implemented outside the boundaries of the protected area.
3. Protected natural areas must be managed without disturbing the natural processes, except in cases when the purpose of protection is to maintain a cultivated landscape with

traditional farming activities. The management of such areas must prevent deterioration or disturbance of life communities.

4. Attempts should be made that in-situ conservation should focus on the long-term viable size, the genetic and demographic structure of various populations, and potential spread and reproduction of species.
5. On the basis of the precautionary principle, measures need to be applied to prevent any harmful effect of invasive species on ecosystems, native species or habitats. Wherever it is possible, all risks need to be eliminated that may be caused by alien species. All this requires basic research.
6. The network of protected areas must be established in a way that the movement and migration of biodiversity components, including of important keystone species or protected species of life communities between the individual area patches should not be restricted, and that the genetic relationship between populations should be maintained.

Tasks

1. Implementation of the relevant EU directives, with special consideration to fulfilling the tasks regarding the network of Natura 2000 sites.
2. The process for designating areas for protection must be accelerated even if the required and necessary financial resources are not fully available in a particular period, because legal protection on its own may prevent the decay of a natural habitat.
3. In terms of local governments' environmental programmes and their implementation, local governments should be encouraged to designate areas for protection.
4. The personal, physical and financial conditions required for operation in compliance with Hungarian legal regulations and international requirements must be put in place in all protected natural areas and Natura 2000 sites.
5. The conditions of work taking place on protected natural areas need to be improved continuously: small and island-type protected areas need to be guarded adequately. One ranger should not be responsible for more than 3,000 hectares, and the rangers must be given sufficient competence and instruments.
6. Attempts should be made to use a zone system of national parks in management practices too.
7. New Biosphere Reserves have to be established that can be part of the International Biosphere Reserves Network.
8. Satisfying the requirements of the Ramsar Convention, the number and size of protected wetland areas must be increased. The survival of especially sensitive areas, rich in species – if necessary, with the use of habitat reconstruction programmes – must be supported with all possible tools and methods.
9. Management plans for protected areas have to be developed.
10. Protected areas cannot be preserved in-situ without reducing the harmful external effects. Therefore, in the case of important protected natural areas, according to necessity, protection zones (buffer areas) with sustainable landscape management need to be formed.
11. The restoration of habitats and related research must be continued.
12. Urgent measures are required against invasive species. Basic research is required to analyse the role and effect of deliberately introduced or spontaneously spreading species on biodiversity and identify the human effects that help the spread of these species. Measures need to be introduced on protected natural areas to terminate all effects promoting the spread of invasive species (reconsideration of land use methods, etc.).

Strategic objective 2: Conservation and development of biodiversity outside protected natural areas

Strategic considerations

1. The biosphere forms a complete unit, therefore, based on the holistic approach, the elements of nature, species, communities and ecosystems need to be preserved in their complexity while maintaining their operation.
2. Wild flora and fauna can only be preserved by maintaining their habitat and life communities, yet the extension of habitats on protected natural areas is often not enough for the conservation of long-term viable populations. This is why habitats must be maintained outside protected natural areas too.
3. The importance of none of the species can be disputed. Each species must be treated as a potential asset, analysing its role in the system, or its potential use as a resource.
4. Biodiversity must be protected at landscape level, namely regional and rural development programmes must encourage the preservation of the landscape, which can be achieved by the conservation and proper management of diversity at landscape level.
5. Bearing in mind the consistent nature of Natura 2000 network and the need for habitat coherence, attempts should be made to ensure continuity of the natural elements of the landscape structure, preservation and restoration of the operation of ecological corridors.

Tasks

1. In relation to the implementation of Council Directive 79/409/EEC on the conservation of wild birds and the Council Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna (hereinafter Birds and Habitat Directives) measures need to be introduced to ensure long-term conservation of species listed in the appendices of the above directives under their natural distribution areas.
2. Requirements must be stated for various sectors with which the conservation of biodiversity outside protected natural areas can be achieved.
Such requirements:
 - system and connections of habitats (coherence), and
 - conservation of ecological characteristics of habitats.

Protection of biodiversity assumes the maintenance of ecological characteristics of various natural systems, especially considering ecological water demand, factors forming the local climatic conditions and carrying capacity.

Tasks in relation to the conservation of connections between habitats

1. The real ecological importance of ecological (green) corridors must be identified in the most important cases, indicating their role in maintaining connections between habitat-patches, being an intermediary for key-species and protected species and in the dissemination of invasive, intensively spreading species.
2. Plans need to be developed in order to improve the landscape structure, increase the number of natural elements of landscape structure by habitat restorations and, as a final objective, connection must be established between natural habitats.
3. Wherever the natural habitats of the original landscape structure can no longer be restored, connections between habitats must be ensured with artificial green corridors (bushes and rows of trees, hedgerows, borderlands, ditches, banks, etc.).
4. The appropriate proportions and mosaic-structure of cultivated, natural and semi-natural habitats should be aimed at, in accordance with the characteristics of local species.
5. The various programmes need to be defined at landscape level in order to develop

habitat systems. Outstanding importance is devoted to the programmes for the restoration of the rivers Danube, Tisza and Tisza's tributaries, as well as measures aiming at long-lasting improvement of the ecological conditions of Lake Balaton.

6. When preparing regional development and regional plans – primarily in case of decisions concerning land use – attention must be paid to the maintenance of operation of ecological corridors primarily when planning line infrastructure facilities.
7. Habitats fragmentation is mainly caused by transport infrastructure development, in order to prevent this, programmes and compensation mechanisms need to be developed, which reduce and rationalise transport and transportation through the strengthening of local economies and markets, changes of consumer habits, and development of transport culture.
8. The Carpathian Basin is a transit area in terms of transportation and spread of species. This generates a conflict of interests, because transport and transit transportation demands are continuously increasing, but, at the same time, routes must also be provided for the natural flora and fauna migrating in the basin in different directions. This is why passages and connections are necessary on the already constructed and future roads, which make possible the safe movement of living beings, for example, between their reproduction and feeding areas.
9. Migration opportunities and routes and even the transboundary movements of flora and fauna must be ensured by connecting the relevant habitats on both sides of the borders. This requires the establishment, connection and protection of sufficient ecological corridors, promoted in co-operation with neighbouring countries.

Tasks related to the conservation of ecological characteristics of habitats:

1. The various forms of air pollution and increasing greenhouse effect influence biodiversity in different ways. In order to avoid unfavourable impacts, risks of the industrial, transport and energy sector must be identified and ways need to be found to reduce ground level ozone. Moreover, the regional effects of climate change on biodiversity also need to be identified.
2. The society must be made aware that global warming may have negative effect on potential yield and has harmful effects on our life quality through numerous factors.
3. The results of measures aiming to reduce global warming are important in terms of the objectives of the Convention as well. In order to mutually support the set objectives, the inter-connections and potential co-operation between the Convention and other international treaties must be identified.
4. In order to preserve ecosystem functions, the ecological water demand of various habitats, and ecosystems depending on groundwater must be explored in accordance with the provisions of the Water Framework Directive. All river basins need to be analysed based on water quality and quantity, including also the various agricultural, energy, industry and drinking water use requirements.
5. In areas where the water balance has changed on a regional scale as a result of river control or other reasons, action plans need to be developed to increase the ecological functions of the soil, reduce erosion, improve the conditioning effect of vegetation, and regenerate the processes maintaining water cycle.
6. The restoration programmes on backwaters must be continued primarily on the lower sections of the rivers Tisza, Körösök and Danube.
7. Biodiversity considerations need to be integrated into regional, urban and rural planning, and water management planning, etc.

Strategic objective 3: Strengthening ex-situ conservation

Strategic considerations

- 1 There is no doubt that the most effective, cheapest and most natural method of conservation of the natural flora and fauna is in-situ protection. This should always be given priority, and resources must be focused on it. In-situ protection, primarily in the case of plants, can be supplemented with ex-situ conservation methods if necessary. For instance ex-situ conservation can be applied to the reintroduction of certain plant species, when the populations have decreased to a critical size in nature, and therefore, this method can contribute to the stabilisation and strengthening of decreasing populations.
- 2 In the case of cultivated or bred species or sub-species – including species used in forestry, as well as domesticated and bred animals – it is absolutely necessary to prevent genetic deterioration and to maintain a genetically variable and fertile population, which guarantees the future viability and favourable quality of varieties and species.
- 3 With ex-situ conservation one can maintain populations that carry the genetic programme of how to adapt to certain special habitat conditions, and can also preserve species that are tolerant to environmental impacts and resistant against diseases, the characteristic features of which can be used in breeding.
- 4 Ex-situ conservation relates to the revival of natural life communities, traditional farming methods and cultures, representing genetic reserves and sources. It can also be connected with the increase of product diversity as it helps the appearance of products with new characteristics (flavour, resistance, etc.).

Tasks

1. Those natural species must be identified in the case of which ex-situ conservation can be applied with the help of which the species can be sustained and become capable of reintroducing to nature. This also requires methodological research.
2. Adequate ex-situ conservation must be provided in order to preserve wild species and wild relatives of cultivated plants, as well as wild plants and food-producing animals whenever their in-situ conservation is not feasible, or these species are seriously in danger.
3. Zoos and botanic gardens must have a proper role in the conservation of genetic stocks of endangered native species and their reintroduction.
4. Rules need to be developed for the collection of various species for ex-situ conservation.
5. Ex-situ conservation of plant species and varieties must be integrated into the activities of botanic gardens and these tasks must be implemented because botanic gardens can maintain, analyse and reproduce larger populations.
6. Botanic gardens must be made suitable for various tasks, for which the right conditions need to be ensured: establishment and maintenance of a gene bank, increase of degrading natural populations with reintroduction, experiments for the artificial reproduction of rare and protected species, in vitro conservation of protected species, establishment of seed bank or other adequate storage.
7. A Hungarian network of botanic gardens would be the best solution for co-ordinated conservation of the gene-base reserves of the Hungarian flora. High-level Hungarian zoos must have a similar role in conserving the gene reserves of animals.
8. The gene bank network needs to be developed, for which a long-term financial basis and experts must be provided. The entire selection of Hungarian landraces must be collected and conserved (landrace collection system). An especially urgent task is the

collection of fruit varieties.

9. Based on foreign practices, a method should be developed for economic valuation of genetic values of the wildlife and gene banks.
10. The efficiency of ex-situ conservation is increased if the conservation of more and more species takes place under in-situ conditions. Therefore, opportunities, preferences and rights should be given to the people living close to protected natural areas that encourage nature-friendly farming activities based on ethnographic and agro-historical traditions, as well as processing of natural materials.
11. Strengthening of state measures related to cultivated plants and bred animals. If the measures apply to varieties that are close to extinction, the measures should involve the supply of seeds, seedlings and other stocks free of charge, or they should be allocated to local contractors for cultivation and breeding with significant state support.

Strategic objective 4: Sustainable use of biodiversity and its components, and putting in place the instruments and tools required for sustainable use

Strategic considerations

1. The concept of sustainability requires simultaneous and parallel sustainable use and conservation of natural resources, including the components of biodiversity. The key of biodiversity conservation is the sustainable use of biological resources. The concept of sustainability means the following:
 - We need to understand the biological principles of operation of self-sustaining systems and the instruments required for sustainable use must be developed on the basis of those principles.
 - The use of biological resources cannot reduce or endanger the future viability of any resource in use, or its potential future use.
 - The use of biological resources cannot detrimentally influence systems supporting or relating to those resources even on a long-term basis.
2. Regional development policies are of key importance for the purpose of sustainable use of resources. Excessive exploitation of areas may be avoided with a more balanced distribution of development and economic activities. It can also help to ensure that aspects of biodiversity conservation are taken into account everywhere. Consequently, regional and rural development policies must be based on the principles of sustainability.
3. A special dimension of rural development policies comes from the fact that up to now there has been inverse proportionality between the economic and infrastructure development of rural areas and their biodiversity, namely, the values of biodiversity have been conserved in underdeveloped regions. Consequently, a completely new type of planning, value concept, and practical implementation of sustainable development are required to prevent future damages in natural assets caused by the development of rural areas. Special attention needs to be paid to rural areas, where in many cases continuous agricultural activity is required in order to avoid the destruction of habitats.
4. It is also obvious that sustainable use of biodiversity components can not be achieved unless we are sufficiently aware of the resources available to us, there is sufficient scientific knowledge and technologies developed for sustainable use, there is a central and local institutional system necessary for the achieving the objectives, there are adequate legal and economic regulations, the society acknowledges biodiversity as a value, and serious steps are taken both in public education and general education outside schools in order to disseminate and introduce information in practice about

- biodiversity.
5. Among medium-term plans, priority must be given to the development of a set of tools aiming at the achievement of clear targets, so that specific measures and investments designed for the conservation and sustainable use of biodiversity can be implemented successfully with an effective use of costs.
 6. In order to apply the precautionary principle in practice, considerable attention must be devoted to the review of various national, regional and local development plans. In this review, the plans must be evaluated in terms of conservation and sustainable use of biodiversity.
 7. More importance should be given to economic incentives (subsidies, taxes, fees voluntary agreements, internalisation of positive externalities of biodiversity – and negative externalities of biodiversity loss – into cost-benefit analyses, etc).

Tasks

Research

1. In order to avoid parallel research and support, some of the research tasks should be co-ordinated in international co-operation within the Research and Development Framework Programmes of the European Union.
2. The programmes and resources of applied research activities focusing on connections between biodiversity and individual sectors must be provided within individual sectors. Taking into account the inter-sectoral relations, the extensive dissemination of information and application of research results need to be ensured too.
3. The following themes and objectives must be in the focus of research:
 - Research activities supporting the development of instruments for biodiversity conservation, especially focusing on the social and economic relations of biodiversity.
 - Protection and sustainable use of biodiversity, changes in legislation, economic development programmes and political activities, necessary for the fair sharing of benefits arising out of the utilisation of these resources.
 - Disclosure, assessment and economic evaluation of natural capital.
 - Development and practical application of methods monitoring and evaluating the state of biodiversity, including monitoring of processes negatively influencing biodiversity as well as of effects of favourable measures.
 - Study of the natural dynamism, evolution processes and functions of biological systems.
 - Support to research, studying the operation of ecosystems, as well as the impacts of global warming already being felt or expected.
 - Support to research based on molecular methods and introduction of molecular technology for the purpose of studying genetic variability.
 - Scientific establishment of landscape ecological research activities and interventions aiming at the restoration of habitats and evaluation of their impacts.
 - Support to research related to the operation of the ecological network and ecological corridors, as well as elimination of factors hindering operation.
 - Analysis of succession processes and their potential use in habitat restoration activities.
 - Support to research promoting the development of habitat restoration methods.
 - Research of the invasion mechanism, and support to research aiming at the reduction of invasive plants and animals.
 - Research promoting the development of various economic incentives and analysing the agricultural and forestry support systems.

- Research aiming at the sustainable use of biodiversity components, with special consideration to the conservation and enhancement of biodiversity of natural, agricultural, forestry and fishing areas.
- Development of nature-oriented technologies taking biodiversity conservation as a priority in sectors (for example, forestry) where the economic exploitation of natural resources may also damage them.
- Impact of biologically non-degradable, or persistent chemical substances and their intermediary products on biodiversity primarily based on genetic and ecological considerations.
- Assessment of impacts regarding the use of genetically modified organisms.

Monitoring

1. The key information concerning the biodiversity of the country needs to be collected, classified, reconciled and supplemented.
2. In order to save nature and improve cost efficiency, attempts need to be made to avoid parallel research. The methods applied should prevent or minimise major intervention and damages in nature.
3. Monitoring the status of biodiversity must be part of the system monitoring the changes in the state of the environment, therefore the programme studying the environmental status of Hungary must be accelerated.
4. The already developed National Biodiversity Monitoring System (NBMS) must be continuously operated and developed, based on information originating from the system.
5. Identification of indicators of unfavourable impacts on biodiversity in Hungary and monitoring of changes.

Information flow

1. The full-scale operation of the Nature Conservation Information System must be ensured and the Hungarian institutional information system needs to be developed so that Hungarian institutions can operate in line with the activities of the European Environment Agency and its Information and Observation Network.
2. National and regional representative and fundamental information must be collected and managed in a standard system, the information must be assessed regularly, and arrangements are required for the publication of, and access to, such information.
3. The information system should be regularly updated by new information related to biodiversity and research results.
4. The information available must actually be used in the planning of local, regional and national programmes, making sure that the most important information reaches decision-makers and the general public.
5. The Hungarian database of the international Clearing House Mechanism (CHM) of the Convention must be developed continuously.

Strategic objective 5: Development of social awareness, required for the conservation and enhancement of biodiversity: education, training and information

Strategic considerations

1. A considerable part of factors imposing a risk on conservation and sustainable use of

biodiversity originates from contrary short-term economic interests, as well as people's way of thinking, attitude and behaviour. Consequently, the strategy can only be implemented if everybody involved in the implementation are aware of the factors affecting biodiversity as well as potential solutions. Changing the current approach requires long-term and joint efforts from people working in education and training.

2. Social awareness is a key prerequisite of successful implementation of tasks related to biodiversity, involving, for example, the development of a consumer policy that promotes protection and sustainable use of biodiversity. Therefore, new types of social awareness-raising campaigns and instruments need to be established and implemented. Non-governmental organisations and the media have very important role in this.
3. Implementation of the strategy for the conservation of biodiversity requires special and up-to-date technical expertise from various participants. This expertise can only be achieved if the relevant training is sufficiently related to scientific, technical and professional development.
4. The objective of nature conservation conceptual education is to develop new moral and behavioural standards, and to strengthen awareness and environmental sensitivity in order to conserve biological diversity. It must be recognised that all forms of life are unique, thus eligible for respect, irrespective of whether they are useful for the people or not.
5. Forms of training have to be established which are able to supply the implementation of this Strategy with professionally well-trained people.
6. Relations of biodiversity, and knowledge and concept related to sustainable development should be developed comprehensively, at all levels of education in school and training. Not only special skills and knowledge must be taught, but various relations also need to be pointed out.
7. Extending the knowledge of decision-makers, the aim should be that they understand the importance of biodiversity. This applies especially to leaders of those sectors the activities of which significantly determine biodiversity.

Potential involvement of the society

1. The involvement of society significantly increases as a result of Act LIII of 1995 on the general rules of environmental protection. The act provides a possibility to interfere in legislative and decision preparation processes. Available instruments: freedom of access to information, referendum, public hearing, co-operation in consultation bodies, public hearings of environmental impact assessments, community initiative procedure (client role), right to litigation. According to the Aarhus Convention everyone must have the right to access information and to participate in decision-making with regard to environmental matters. Various actors of the society should be encouraged to use all legislative instruments available for the involvement of the society.
2. Possibilities of access to environmental information are regulated by law, and they are reflected in mandatory reports at national and local government level. Local governments must be forced to fulfil this legislative obligation and their reports should also contain information on biodiversity.
3. It is desirable to disseminate the results to the wider groups of the society with the help of the National Biodiversity Monitoring System. Programmes should also be launched which can be joined by many participants, so that it increases the number of participants and their knowledge about nature.

Co-operation

1. Based on Hungary's bio-geographic situation, it is in Hungary's elementary interests that the neighbouring countries should also conserve their biodiversity and natural status of their territories. This demand requires political and regional co-operation for biodiversity within the framework of 'one bio-geographic unit'.
2. Hungary's biodiversity is a very important resource for the future development of the country. It is also a common European asset. Consequently, decision-makers must recognise that the biodiversity of Hungary and the Carpathian Basin is a resource, which will have a fundamental role in future development and that the conservation and enhancement of the currently favourable status of biodiversity requires co-operation within the Carpathian Basin.
3. Within the framework of co-operation it is important to co-ordinate various national and EU plans and actions aiming at the conservation and sustainable use of biodiversity.
4. Biodiversity considerations must be integrated into the sectoral policies.
5. According to the provisions of the Espoo Convention, in relation to individual measures all impacts must be identified that impose a risk on biodiversity of Hungary and other states. The neighbouring countries must be notified about such hazards, and the hazardous sources must be eliminated.
6. Co-operation requires more co-ordinated work within the country too among organisations engaged in the protection and sustainable use of biodiversity, as well as various actors of the society.

Strategic objective 6: Fair and equitable sharing of benefits arising out of the utilisation of genetic resources

Strategic considerations

1. In terms of genetic resources, the Convention on Biological Diversity confirmed the sovereign rights of individual countries over their own genetic sources, and access to them under mutually accepted terms and conditions accepted by the countries concerned).
2. Under the Convention, based on the mutual agreements, Hungary facilitates other Parties to access its genetic resources, and to develop and carry out scientific research based on the genetic resources provided by other Contracting Parties with the full participation of such Contracting Parties while ensuring the sharing of arising benefits with the country of origin, and to facilitate transfer to other Parties of technologies that are relevant to biodiversity conservation.

Tasks

1. Establishing conditions related to the sharing of benefits arising out of the utilisation of genetic sources.
2. Voluntary, bilateral co-operation guidelines, which need to be developed, when Hungary or only a few countries intend to have access to a particular resource and when Hungarian genetic resources are intended to be used.
3. Initiating research aiming at the study, enhancement, conservation and sustainable use of genetic resources, and research co-operation with countries the resources of which Hungary intends to use, and countries that intend to use Hungarian genetic resources.
4. Wide co-operation in the best research utilisation technologies and promotion of their transfer.

Strategic objective 7: Integration of biodiversity conservation considerations into sectors, sectoral strategies, regional, micro-regional and local plans and programmes

Below we shall define the key sectoral strategies for the purpose of implementation of the overall objectives of the Convention:

- Mining
- Forestry and forest management
- Fish management, fishing, angling
- Agriculture
- Regional development and tourism
- Land use
- Hunting
- Water management
- Molecular biology methods and biodiversity

II. MINING

INTRODUCTION

Mining in Hungary at present

Pursuant to the provisions of Act XLVIII of 1993 on mining, mineral resources, i.e., resources in the bowels of the Earth are owned by the state. The extraction of those and making them accessible for the national economy is in the interest of the society and the state. Similarly, conservation of natural assets and natural or nature-close conditions, as well as protection of biodiversity and existing ecological systems represent equally important principles. In many cases, the two interests are in antagonistic contrast with each other. By protecting an ecological system, it becomes impossible to extract mineral resources in open mining.

Mining in Hungary is primarily determined by the geological structure of the territory of the country, as well as the financial conditions of the market economy. The main type of mining (open or deep mining) is determined on the basis of technical considerations and economic calculations. However, we must not forget about those closed mines either which have been terminated but their indirect or direct impact can still be felt in the changes of biodiversity, or other natural values.

Approximately 75 per cent of the surface of Hungary, and its near surface structures, consist of loose sedimentary rocks. Consequently, open mining of gravel and sand, as well as clay, relating primarily to construction and construction material industry, is of key importance. In relation to these areas, open mining of lignite and brown coal for power plants and peat mines used for soil improvement are also important. On the hills and mountains construction industry is the main "customer" of mining. The various dolomite, limestone, marl, sandstone, basalt, andezite, riolite, dacite (and their tuffs), diabase, granite and perlite quarries were, or are still operating, for such purposes. Mineral raw materials used for other purposes, such as ceramic and fire resistant clays, glass industry and foundry sand, quartzite, zeolite, alginite etc. mines extend the number of open mines, although they occur more rarely. Until the 1990s, the mainly deep coalmines as well as bauxite mines with occasional spectacular open mining were of outstanding importance too. Following the change of regime and the economic restructuring, these mines have lost their significance; most of the coalmines have been closed, while bauxite mines still operate as open mines and deep mines, although their number and capacity have reduced significantly. The only deep manganese ore mine in Hungary satisfies the rather reduced demand of the Hungarian steel industry. No other ore mining activities take place in Hungary apart from bauxite and manganese ore. The direct and indirect impact of deep copper, zinc, lead (and fluorite) mines, which were active in the previous decades and centuries, can still be felt today. The iron ore mine, which operated with significant capacities as an open mine and deep mine also waits for the re-utilisation of its area. The hydrothermal processes have created gold and silver ore formation in small concentrations in the Northern Mountains. Precious metal extraction has been a secondary product of poly-metallic ore, and separate precious metal mining has never been economically efficient in Hungary. However, after the adoption of the new Mining Act, non-ferrous and precious metal research activities have started at various sites. However, potential gold mining would only be economically effective as a high-volume open mine, but it would have severe direct and indirect impact on the environment.

Hungarian hydrocarbon mining has an important role in energy management. The carbon dioxide resources of the surrounding area of Mihályi in Győr-Moson-Sopron county

are outstanding. Water extraction is in a special situation and is increasingly important, involving both potable water and thermal water.

Main types, characteristic scope

The extracted materials are components of the Earth's crust, either situated deep in the Earth, or close to the surface, occasionally forming part of the surface of the Earth. On the basis of the position of these materials as well as economic considerations, the following main types of mining exist:

- Open mining: The original surface changes on the entire area used by mining - as a direct effect; most of the biological and non-biological natural assets are destroyed, with the exception of animal species capable of migration and non-biological assets rescued as saved findings.
- Deep mining: The mineral resources are extracted at the depth of tens and hundreds of meters below the surface (in extreme cases even below one thousand metres). There are direct and indirect impacts on the surface.
 - Direct impact is the change of the characteristics of the area covered by the surface establishment of the mine (buildings, other service structures, roads, waste stockpiles, storage facility, etc.). In terms of nature conservation and landscape protection, the waste stockpiles and slurry dumps have the largest impact, with their significant landscape destroying effect and contamination of the natural environment by the materials washed from them, imposing direct hazard on the flora and fauna of the area and biodiversity.
 - Indirect impact is the changes in hydro-geological conditions resulting from the active or passive water protection of the deep mining area (the process may reverse after the termination of mining, and the system may be regenerated). The collapse processes in the ceilings of deserted and insufficiently filled mining cavities may cause cracks and fractures in the ceiling of the mining cavity, which sometimes reach the surface too, and along which groundwater and other potential stratal waters may seep into the depth, making the layers near the surface dry out. These fractures may cause dips in the surface, changing the original morphology, and severely damaging the roots of plants, and stability of heavy trees.
- Fluid extraction (including gas – natural gas, carbon dioxide – production too): The raw materials in depth are extracted through wells created with deep bores. There are primarily direct impacts on the surface, which may be observed on the area involved in well construction, operation, and the construction of transportation pipelines and collection stations. The indirect effect of extraction of these materials on the surface cannot be proved but certain situations, for example hot water leakage resulting from hydrocarbon research, may create spectacular and interesting morphological elements (travertine hill in Egerszalók, or special habitats too).

The scope of partial or full surface change derives from the size of the mining space established in a public administration procedure, which depends on the type and position of the mineral resource, the absorbance of the market, available production capacities, and business policy considerations. As a result of the geological and economic features of Hungary, the effective scope of mining may change most extremely in relation to open mining: its territory may vary between a few hundreds of m² to several km²s. The direct impact of deep mining may vary around a few hectares, while its indirect impacts may vary around tens of hectares. The area used for fluid extraction is very rarely larger than one hectare.

Consequently, mining drastically restructures the surface. It practically eliminates the original conditions on the territory with its direct impacts. Habitats are destroyed, and anything that cannot escape, part of the fauna and the entire flora, is destroyed. The concept of biodiversity loses its meaning in this context. However, under the right conditions the flora and fauna are capable of partially, or sometimes fully regenerate itself. The situation is quite different in the case of the non-living natural values, the description of which may be found in the National Nature Conservation Policy Concept:

The objects belonging to the so-called non-living natural values reflect the various events of the history of Earth: the structural movements of the Carpathian Basin, climatic changes, accumulation and erosion processes, episodes of the changes of flora and fauna for the use of special sciences and, with their intermediation, business and production sector, scientific and public education. They are scientific databanks, objects of nature conservation and the rich collection of earth studies (paleogeographic reconstruction, palae-ecology palaeo-anthropology, palaeontology, palaeo-climatology, palaeo-botanics, palaeo-zoology, mineralogy, etc.).

Their common feature is that they have a fixed location, and they cannot be transferred. They are usually individual non-renewable and uncorrectable formations, forms, sets of forms, layer sections, habitats or special biotopes exposed to final extinction in case of fatal damages.

If the area affected by mining also contains non-living natural values, there is a high probability that they will be severely damaged, and often completely destroyed. Consequently, mining produces a significant conflict in terms of both live and non-living natural assets. However, mining activities also create a new situation and new opportunities. It exposes a geological situation, which has never been seen before, only perhaps assumed as a result of a research, it exposes the inside of a hill, occasionally presenting scientific, educational and aesthetic values. It creates new surface formations, as well as new habitat types (for example rock wall, sand wall, wetland habitat), which must be taken into account in landscaping after the mine has been closed.

This indicates that in terms of biodiversity a position on mining and mining related activities can be reached only on the basis of very careful consideration. The strategy of implementing the aspects of biodiversity must be developed on the basis of the general principles and the main phases of mining activities. These phases are the following:

1. Selection of the area for research
2. Research for the mineral resources
3. Mining extraction
4. Landscaping after the closing of the mine
5. Utilisation of the landscaped area, follow-up care

Estimated results

The implementation of the Strategy for the mining sector may help to reduce damages in biodiversity to minimum in areas used for mining activities.

Certain deserted mining areas are suitable for the development of new or more favourable habitats, which will have a favourable impact on biodiversity (for example old mining storage facilities serve as special bat habitats).

Sometimes mining activities create new natural assets when they explore the inside of the Earth for science and education (including environmental education) and, in special cases, for tourism. This exploration provides new information and tangible findings (minerals, fossils, geological and stratigraphical formations, tectonic elements, spectacular geological and geo-morphological shapes, etc.) which all provide an aesthetic experience. The measures

protecting these assets as well as biodiversity provide hope that the energy spent on landscaping will not be wasted and the natural assets, including biodiversity, enrich our environment even in areas affected by mining.

STRATEGY

General principles

- Attempts should be made to optimise mineral asset management. In view of the fact that Hungary is not abundant of economically extractable mineral sources, mines should be opened and operated on the basis of realistic demand. It should not be possible to open “alibi” mines, which only occupy an area, but put an unreasonable pressure on the environment.
- In the case of non-renewable natural resources, we must think on a long-term basis, and take steps to reduce demand for mineral resources. Consequently:
 - preference should be given to technologies that are capable of replacing or partially substituting mineral products (for example, asphalt, fragmented concrete debris, rubber used in road construction, other recycled products),
 - attempts should be made for the economic and effective use of extracted mineral resources, as well as for the news of renewable energy sources.
- Production and export of products with a higher level processing need to be encouraged.
- The export of unprocessed mineral resources should be reduced in order to satisfy Hungarian demand on a long-term basis and reduce the pressure on the nature on a long-term basis.
- Priorities need to be set in terms of mining activities and natural assets, including biodiversity.
- The legislative background of mining must be adjusted so that it should protect allow for the conservation and sustainable use of.
- Special attention should be devoted to geological natural assets making sure that mining does not damage them, and that the values identified in mining can be preserved and they can be used as nature conservation demonstration for conceptual education and awareness raising.

Objectives according to phases of mining activities

1. Selection of the area:

- The available natural assets, and protection level of the applicable area need to be taken into account during the selection of the site designed for research for mineral resources.
- The effective regulations applicable to the area must be studied and, based on a regional approach, an analysis needs to be prepared as to how many mines can be borne by the region and what capacity those mines can have.
- Attempts should be made that an adequate decision is reached to avoid the unnecessary disturbance or jeopardy of the natural assets of a particular area. (No research activities should take place where mining cannot be licensed.)

2. Research process:

- All research activities must be conducted with the smallest possible pressure on the nature, therefore, the biodiversity of the area is least damaged and can be sustained for the longest time. This is important because often research is followed by production only some years later or sometimes no production will ever take place.
- 3. Mining production:**
- Whenever mining production begins, biodiversity considerations must be recorded and taken into account in the various public proceedings, and regulation must include measures concerning natural and geological assets potentially found during production and those already known in the area must be taken into account.
 - The regulation must also concern potential hydrology and hydrogeology issues too.
- 4. Landscaping after mining:**
- In landscaping, the areas changed by mining must be reconstructed so that biodiversity should be as close to the original conditions as possible. A diversion may be made from this objective depending on an approved purpose of re-utilisation. Changing of habitat types is naturally allowed depending on the nature of mining.
 - Geological natural assets, disclosed in production, can have an important role, and they should be integrated into the re-utilisation process.
 - Aspects of education, information supply and tourism need to be focused upon in landscaping.
 - Existing mining lakes and subsurface mining space may also contain important habitats, therefore, during landscaping and re-cultivation the aspects of biodiversity must be respected there too.
- 5. Utilisation of landscaped areas, follow-up care:**
- The re-utilisation objective, stated in the approved landscaping plan, must actually be implemented.
 - During the utilisation process, attention needs to be paid to biodiversity protection.
 - On the landscaped area, regular controls are required to make sure whether utilisation and follow-up care are in line with the applicable regulations.
 - The utilisation method approved in the landscaping plan should actually be active for at least five years, for which the required nature conservation treatment must be provided.

ACTION PLAN

1. Selection of the area:

- During the selection of an area for research of mineral resources the level of protection of the relevant area must be taken into account, together with special literature, information. In addition, based on site re-ambulation, the natural assets identified in the inspection also need to be analysed with special respect to biodiversity and geological assets. It is important to highlight valuable geo-morphological formations, which are spectacular or interesting for surface development.
- The impacts estimated in the natural environment must be evaluated in accordance with the planned type of mining activity.
- The use of the area for mining purposes cannot violate the effective regional or urban and rural plans and other legal regulations concerning the activity.

- On the basis of a regional approach, the mining pressure of the area needs to be analysed, for which the legislative background will be the establishment of a ministerial decree indicated in Section 9 (2) of Act XLVIII of 1993 on mining.
- By amending the legal regulations, the research licences approving the selection of the area may also indicate potential restrictions or prohibitions in terms of future mining activities. Thus the contractor can decide in time about the actual research, with which any unnecessary disturbance of natural assets can be avoided.

2. Research process:

- Research involves a risk that mining production will not take place either because of its results, or because of the new information disclosed in a public administration procedure. Then the original conditions must be restored on the research area. Consequently, research must be conducted with the smallest damages caused to nature.
- When the research method is selected (approved), attention should be paid to aspects of biodiversity. Some timely and spatial restrictions may be required, because, for example, certain geophysical methods will cause significant treading damage, and excessive prospect trenches leads to excessive surface destruction.
- Deep-bore hydrocarbon research requires the largest area. When the bore point is set, the natural assets of the area concerned must be examined and, if necessary, alternative spots must be defined for bores.

3. Mining activity:

- The commencement of mining activities requires an environmental license based on an environmental impact assessment, and in certain cases a standard licence of environmental use. All affected natural assets must be identified, and the events influencing biodiversity must also be evaluated.
- When the mining space is established, aspects of biodiversity conservation must be taken into account. If there is a protected area nearby, the size of the buffer zone and activities eligible for licensing there need to be taken into consideration. In order to protect assets subject to protection on unprotected areas, the legal regulations should allow the establishment of buffer zones.
- Pillars protecting major natural assets must be identified in the technical plan.
- Mandatory actions applicable to live and non-living natural assets turn up during production or suspension must be identified, with special consideration to the conservation of biodiversity.
- Outstanding importance needs to be devoted to caves discovered in mining, which have a favourable impact on biodiversity, and also contain a lot of non-living values.
- Any water formation developing during production must be protected from contamination, so that at the end of disturbance the spontaneous processes of nature can take place, and a self-sustaining aquatic habitat can develop.
- In case of deep mines, the ecological water quantity, required for the maintenance of biodiversity on the surface – taking also into account the original conditions – must be guaranteed.
- The waste stockpile must be formed already during the production phase, so that its position should not destroy habitats, and they should have the least unfavourable impact on the local landscape. Whenever large waste stockpiles are created, the surrounding landscape features must be respected. Piles can only have slopes on which plant cultivation can take place without any shoulders.

4. Landscaping after mining:

- The reconstruction of any area affected by mining activity takes place on the basis of a landscaping plan, which takes into account the aspects of biodiversity.
- In addition to the integration of the damaged area into the landscape, and its re-utilisation, landscaping is also aimed at the elimination of potential accidents. This latter activity also has an impact on the biodiversity of the area, because loose sidewalls or the breakdown of large rocks, loosened by frost may change and destroy habitats.
- During the development of the concept for a landscaping plan, a distinction must be made whether this phase follows (and closes) the completion of mining or whether it only reconstructs the area of a mine terminated and abandoned for a longer time.
 - In the case of landscaping following the closing of a mine, attempts should be made to reconstruct the original conditions and relevant biodiversity.
 - In landscaping of a mining area deserted for a long time, an analysis is required to assess the extent to which the flora and fauna have conquered the area used by mining earlier, the habitat type(s) that have developed and their impacts on the biodiversity of the area concerned.
- During the landscape analysis, which is part of the landscaping plan, live and non-living natural assets of the remaining mining area must be identified.
- The re-utilisation objective must be defined on the basis of the results of the landscape analysis, which may modify or even completely change the re-utilisation objective, already approved in the resolution establishing the mining space before. (In extreme cases, there may be no need for landscaping at all.)
- In the development of a new concept, protection of biodiversity is an important consideration, but other aspects of education, information supply, science and tourism, as well as geological nature conservation must also be taken into account.
- Landscaping must be performed so that the habitat potential should increase as a result of it (for example, introduction of native species, natural succession processes, reduction of invasive species) and that the habitat should become self-sustaining.
- In order to avoid weed infestation and introduction of species, which were not typical of the area before, and therefore are not desirable, the soil should not be replaced with soil originating from other different areas.
- The water supply of the landscaped area should be designed to ensure the ecological water demand of the habitats as possible, but also finding solutions for managing the water surplus.
- In the case of mining lakes formed in remaining mining pits, space should be left for the development of plants requiring different water depths, which will assist the self-purification processes of the lake and natural introduction of flora and fauna that contributes to the conservation of biodiversity.
- In the case of lakes used for mixed purposes, the coastline should be maintained for natural biological processes on the longest possible sections.
- Landscaping must be performed parallel with raw material extraction wherever mining operation has reached the final banks (for example, boundary of the mining space) so that the flora and fauna could be introduced as soon as possible.
- Whenever subsurface mining areas are landscaped, the possibility for new habitats should be created (for example, closing of mine galleries should be made penetrable for bats).
- If the cavities remaining after deep mining can be involved in education and/or tourism, attempts should be made that the individual parts, forming special habitats, should be left undisturbed for biodiversity.

- When re-cultivating former mining areas, both on surface and below the surface, all materials that do not fit in the environment (wastes) must be removed in order to prevent their harmful influence on the quality of human environment or biodiversity.
- After the closing of fluid extraction, all technical equipment must be removed, and all roads and pipelines, no longer in use, must be eliminated. If there is any contamination, the soil must be replaced, and the original or environmentally suitable habitat types must be restored in order to achieve or approach the pre-contamination biodiversity level.
- Biological landscaping must be an important part of mining landscaping, during which the introduction of native species must be preferred, providing that it is not contrary to the purpose of re-utilisation.

5. Utilisation of the landscaped areas, follow-up care:

- The utilisation method approved in the landscaping plan must be maintained for at least five years. This must be checked every year.
- If the objective was habitat reconstruction, nature conservation type maintenance must be provided for at least five years in order to introduce the native flora and reduce invasive alien species. Controls are necessary in several parts of the vegetative period.
- In the case of special morphological elements (for example, steep rock, sand and loess walls), vegetation must be regulated so that it becomes suitable for nesting birds and birds constructing a hatching cavity (free fly-on access).
- Regular controls are required after the establishment of an aquatic habitat, so that unauthorised interventions should not endanger natural processes.
- In the case of wetland habitats for mixed use, regular controls are required to check whether the proportions of coast sections used for the originally planned economic purpose and natural coast sections have not changed at the expense of biodiversity, and whether economic use is in line with requirements (for example, in the case of a fishing pond is the nutrition supply which may contaminate the water excessive).
- In the case of educational and/or touristic use of natural assets, the conditions of the natural assets, orientation, information and warning signs, as well as security equipment must regularly be controlled.
- All changes taking place in natural assets must be reported to the competent nature conservation authority so that it can take all required (for example, preventive) measures.
- The applicable, already existing legal regulations need to be reviewed on the basis of the issues indicated above.

INSTITUTIONS INVOLVED IN THE IMPLEMENTATION OF TASKS IDENTIFIED IN THE ACTION PLAN

Ministry of Economy and Transport and its institutions, Ministry of Agriculture and Rural Development and its institutions, Ministry of Environment and Water and its institutions, Ministry of Education and its institutions, Ministry of Finance, Hungarian Mining Office, Hungarian Geological Institute, media, non-governmental organisations.

III. FORESTRY AND FOREST MANAGEMENT

INTRODUCTION

In the 1990s, the society paid more attention than ever before to forests and forest management, demanding the maintenance and development of one of the most valuable components of natural environment, forests. The species, structural, operational and genetic diversity of forests became the central issue of nature conservation. The need to get close to nature became a general requirement in the whole world, expected from both forests and forest managers by the society. Attempts for the variable utilisation of forests were aimed at the enhancement of material goods generated in forests, and non-material type forest services, environmental impacts, recreational, holiday, tourism, education and research opportunities.

In Hungary, forests are important carriers of natural biodiversity. The large number of species in Hungarian forests and species related to forests in certain life cycles indicate that forests have an important role not only in the protection of certain important – protected or strictly protected – species, but also in the conservation of general biodiversity. When preserving forests, we must attempt not only to protect important species, but also to maintain the entire operating system. The more natural form in which the total forest ecosystem can be preserved, the more protected and strictly protected species will exist in our forests and will find their living conditions there.

On the basis of conservation biology, which is considered the basic science of nature conservation, the following key principles can be identified for forests:

- The biodiversity of forests cannot only be preserved in areas subject to protection, but the whole systems – in justified cases natural areas – and related protection zones must be protected together with their ecological potential.
- In order to preserve biodiversity, emphasis should be primarily put on conservation of natural forest dynamic processes and their validation. In terms of forests it means that instead of the conservation of natural forests, and their preservation as reserves, natural processes should be preserved as a whole, as they contributed to the development of this complicated life community. In many cases, the objective of the treatment is to assist these processes and to start the processes in some degraded and converted forests.
- Natural forest dynamic processes, and the developing dynamic forest image contain a lot of elements that are extremely favourable for the conservation of biodiversity (e.g. diverse forest structure and special compositions, presence of old and dead trees, natural disturbance and succession stages, continuous forest coverage, favourable micro habitats for species, etc.).
- Forest, as biocoenosis, cannot be separated from the landscape, of which it is an important part. A forest does not only form a unit itself, but it also has dynamic inter-relations with other habitats and landscape elements surrounding it. In order to understand and validate phenomena observed in natural forests, and to introduce nature conservation forest management, it is important to take into account the three levels of natural phenomena: 1) level of individual trees; 2) level of forest stand; 3) level of landscape. The landscape approach is especially important in the case of forest-steppe.
- Man has been a part and will also be a part of both natural and transformed ecological systems. The objective of nature conservation is to maintain natural assets, and to improve the living conditions of man, thus nature conservation efforts cannot be aimed at full exclusion of human activities even in the case of forests. We must find the right balance between forest conservation and human activities.

In order to apply the basic principles, new concepts need to be developed and implemented. It means that it is no longer enough to continue traditional forestry practices

taking into account the nature conservation restrictions stipulated by law, but there is a need for a fundamental change of approach, and introduction of new methods in forest management and forestry activities.

On the basis of the basic principles listed above and for the conservation and sustainable use of forests, the conservation of all levels of biodiversity in forests, and the conservation, maintenance and improvement of conditions of the natural systems of forest are needed.

In order to achieve these, the following strategic objectives must be taken into account:

- To increase the role of forests in wildlife and environmental protection.
- To conserve and restore forest and related ecological systems; to approach the natural forest conditions and facilitate all natural dynamic processes taking place in forests.
- To increase public welfare and cultural services of forests.
- To increase forest assets, and use material and non-material type forest services to the extent which does not have a detrimental impact on other functions of forests.
- To increase environmental awareness in society by describing the natural assets of forests, and the role of silviculture and forest management.

STRATEGY

Objective: Introduction of silviculture and forest management based on natural processes

The living conditions of forest life communities and species can be improved best if those processes have the main impact on the conditions of forests that also form forest development naturally. Natural selection works best in case of natural processes, therefore species corresponding most with the given development status can be found in the forests. If interventions follow natural processes, or they only divert from them to the lowest necessary extent, and attempts are made to introduce elements typical of natural forest conditions in Hungarian forests, the general conditions of forests will improve.

The currently applied forest management methods not only do not follow natural processes, but very often they are contrary to them. The new objectives require new silvicultural and management methods, which are different from the traditional ones. The aim is to manage and maintain forests with most nature-friendly methods, which correspond most with the aim, purpose and natural conditions of a particular forest. Naturally, in a business-type plantation any nature-friendly method would be significantly less important than in a semi-natural forest. Silviculture and forest management interventions must always be determined by individual priorities applicable to a specific area.

- Reduction of invasive and other alien species in protected natural areas and all other areas where they represent a hazard for protected natural values, and wherever forests can be established from indigenous tree species. Planned and scheduled transformation of the composition of non-indigenous tree stocks in protected natural areas.
- Establishment of pre- and transitional forests, important for natural processes and biodiversity in protected natural areas and in forests without any economic importance (e.g. gradual stock transformation, potential use of alternative target stocks). Development of new forest stocks, different from the currently applied target stocks, composed of tree species, native under the given local conditions, and start of natural processes.

- Increase of proportion of natural forest regeneration. Wherever native tree species can be regenerated from seeds or these conditions can be reasonably put in place, this method must be applied.
- Extensive, extended forest regeneration to maintain continuous forest coverage and development of the conditions of application of this method. In the suitable forests of protected natural areas and in forests with protection purpose, stock managing use of trees and other extensive use of forests, ensuring extended continuous forest coverage with stocks of various ages must be introduced (selection and selective cutting, PRO SILVA method, small-area clear cutting). In other cases, the final harvest methods must correspond with the conditions of the given forest, and follow natural processes as much as possible.
- Introduction of forest tending and intermediary cutting methods in forest management that increase the naturalness of forests and makes possible variable tree composition and mixed (multi-species) forests.
- Significant increase in the proportion of stocks over 80 years of age, which can primarily be achieved in forests subject to nature conservation by letting trees live close to the biological cutting age.
- Reduction of not-native herbaceous plants, tree species and shrubs in forest tending interventions, which might lead to poorer life communities and forest stocks consisting of a few tree species only.
- Separation of forests and plantation forests according to legal and technical criteria and development of a differentiated support system.

Objective: Strengthening of nature conservation planning and its co-ordination in forest land areas

By defining nature conservation objectives and by taking into account and integrating nature conservation aspects reflected in management plans, the traditional forest planning system can be used as the basis of nature conservation-type management in forests situated on protected natural areas. This requires the exact definition of nature conservation objectives, as well as close co-operation and discussions between Natural Park Directorates and the competent directorates of the State Forest Service (Hungarian abbreviation ÁESZ) in the planning phase.

- The district forest management plan prepared on the basis of the guidelines of the nature conservation management plan must also contain detailed nature conservation objectives and tasks, management instructions and planning of forest management activities in particular forest land areas. In co-ordination all insufficiencies must be eliminated that currently hamper the transferability of the two systems.
- It is necessary to develop a long-term nature conservation planning system covering several planning cycles, and applicable to specific forest areas.
- Nature conservation objectives that clearly define planning and the activities to be pursued on a particular forest area must be formulated for larger territories and at the level of forest sections in all areas affected by the nature conservation management plan on a long-term and medium-term (10-year planning period) basis.
- A co-ordinated and effective standard nature conservation management plan and district forest management plan must be prepared for forest areas.
- Close co-operation needs to be developed between the competent State Forest Service Directorates and National Park Directorates in planning.

Objective: Nature conservation research in forest land areas

There is increasing demand to apply procedures with which forests continuously cover an area, and natural processes are applied in treatment and management, involving interventions only to the smallest possible extent. Due to lack of primary forests or primary forest research either, we do not have sufficient knowledge about the ways in which natural processes created and maintained forests. Consequently, the research of practical application possibilities is another important nature conservation task. Special attention needs to be devoted to research aiming at nature conservation management and renewal of semi-natural forest-steppes and flood plain forests on the Great Plain – primarily oak forests. These days these forests of outstanding nature conservation importance are regenerated with clear cutting, based on experiences obtained from the regeneration of closed forests. Additional required measures:

- Study and research of natural processes taking place in the major semi-natural forest associations in Hungary (in and outside forest reserves). Identification of the characteristic features of more natural forest images, developed on the basis of natural processes (e.g. site structural elements, relationship between these structural elements and living conditions of endangered wildlife of forests, etc.).
- Experimental introduction of nature conservation management and nature-friendly forest management methods based on the studied natural processes, which may be used later on larger areas in actual operation too.
- Regular demonstration of long-term research results of natural processes in nature conservation and forest publications.

Objective: Development of a monitoring system observing the conditions of forests and changes in those conditions

Forest land areas must be monitored for nature conservation purposes in the framework of the National Biodiversity Monitoring System (NBMS), which was launched in 1998. An outstanding monitoring task is to measure biodiversity and natural conditions of forests, and monitor changes, as well as select indicators suitable for monitoring (species, characteristics of forest structure etc.). A relationship should be developed with already active monitoring systems (nature conservation observation systems, forest reserve monitoring, Forest Protection Network). Continuous impact monitoring, assessing the results of treatments and allowing changes in a particular treatment, or its well explained termination must form an important part of nature conservation management in forests.

A monitoring system measuring biodiversity and natural conditions in forests must be established and operated, and a monitoring system has to be put in place to analyse the impacts of nature conservation (forest) management activities.

Objective: Conservation and conservation management and renewal of forest-steppe forests

The special characteristics of forest-steppe forests (mosaic of closed forest patches and open grassland, as well as not-closed forests) and the special forest management problems and

tasks arising from these characteristics clearly explain why the management of these areas should represent a separate priority. Their conservation, management and semi-natural regeneration require methods that are significantly different from the procedures applied in closed forest, for which we are not prepared yet. Protection of the few remaining semi-natural patches of forest-steppe forests is an outstanding nature conservation task. In the case of forest-steppe forests with native tree species, the forest inspection activities need to be interpreted differently from those applied in closed forests in terms of the size of smallest acceptable closure, patterns of the stock, regeneration period and definition of successful regeneration.

Required measures:

- To ensure the survival of all existing forests, and increase their area.
- Transformation of forests and plantations located on the area of forest-steppe forests and consisting of alien tree species into semi-natural forest-steppe stocks.
- Forest-steppe oak forests on plain areas need to be regenerated in a semi-natural manner, acceptable for nature conservation.
- Review of the regulations applicable to technical acceptance concerning afforestation in the plantation of forest-steppe forests and stock conversion on forest-steppe areas.

Objective: Conservation, semi-natural management and renewal of forests in wetland habitats (floodplains, marshes)

Floodplain areas and marshes – as wetland habitats and as ecological (green) corridors for the migration of species – are extremely important for nature conservation. Conservation of gallery forests and bog forests on these areas and reconstruction of their semi-natural conditions is a primary nature conservation task. At the same time, significant conflicts arise because these are the natural areas with most considerable nature conversion (river regulations, plantation forestry). The need for effective protection against floods also has an influence on nature conservation management of protective forests on floodplains, and the development of semi-natural forest stocks. A significant problem is also caused by the semi-natural regeneration of still semi-natural stocks – primarily oak forests – situated on floodplains. The appearance of invasive tree species (boxelder, green ash) causes the biggest problem on floodplains.

Required measures:

- To improve flow regime of floodplains, with reconstruction if possible, on suitable areas.
- Conservation of gallery and bog forest stocks of outstanding values.
- Gradual and scheduled conversion of forests and plantations replacing gallery and bog forests and consisting of alien tree species into semi-natural floodplain forests and associations.
- Semi-natural regeneration of hardwood gallery forests (oak) on floodplains in accordance with nature conservation aspects.
- Reduction of invasive tree species on floodplains.

Objective: Conservation and restoration of protective forests

By conserving protective forests, which do not represent commercial values, but are important in terms of nature conservation and environmental protection, and introducing natural processes, we can take significant steps to improve biodiversity in the Hungarian forests. In these forests, management interventions need to be performed only if their conditions deteriorate, or natural processes turn towards degradation.

Required measures:

- Maintenance and restoration of the natural conditions of forests on steep hillsides, ravines, gullies, peaks and swallets.
- Continuous forest coverage with locally typical native tree species wherever it is possible.
- Adequate treatments in reconstruction, ensuring smooth survival of the area as a long-term objective.

Objective: Development of ecological network in forest land areas

Forests represent extremely important elements in the National Ecological Network covering the whole country. The largest semi-natural blocks of the network also relate to forests. The landscape-based approach also requires the establishment of a continuous system of forests and other areas valuable for nature conservation purposes, making sure that semi-natural forests are added to the elements of the network at the required level.

Required measures:

- Legal protection of forests designed for protection as soon as possible.
- Review of the conditions of forests situated on strictly protected natural areas and reclassification between certain protection categories if necessary (strictly protected, protected).
- Integration of Natura 2000 forest areas into the National Ecological Network.
- Identification of forest areas, important for ecologic processes and areas suitable for the establishment of green corridors.
- Appointment of natural areas, including natural areas in forests – and announcement of its list.

Objective: Introduction of a forest financing system recognising the public services of forests at the level of society

Forests provide much larger social benefits than their economic importance. These social benefits are manifested in the non-material type services of forests. Forest management cannot account positive externalities arising from forests as an expense, and therefore the society does not pay for them, although they represent costs in silviculture and forest management. A financing system needs to be developed for silviculture and forest management, which at least partially recognises and pays for the created public assets, and covers the expenses of production for forest managers.

Required measures:

- Development of a new financing system for state forest management, covering the costs of public goods and services from the state budget.

- Development of a Hungarian support system for protection and management purposes in the case of private and community forests, taking also into account EU resources.

Objective: Ownership status of forests, asset management in state-owned forests

Before the change of the regime, 70 % of forest areas were owned by the state, 29 % by co-operatives, and 1 % was owned privately. According to the present situation, which developed after the implementation of the compensation and privatisation acts, 59 % of forests are owned by the state, 0.8 % by the community, 40.2 % are owned privately (of this proportion the owners of 13.8 % forests are unknown).

It is significantly easier to implement common objectives, including nature conservation objectives, in the state-owned forests, from the position of the owner than in the case of other types of ownership. In Hungary, the majority of semi-natural forests, valuable for nature conservation purposes, are owned by the state. The aspects of biodiversity conservation clearly require the maintenance of state ownership in these forests. The currently applied forest management in the framework of profit-oriented shareholding companies is not sensitive enough to perform public, as well as nature conservation tasks in forests. The contradiction between the strict provisions of acts on forests and forest protection and nature conservation, as well as profit-oriented requirements of operation represents a source of permanent conflicts.

Required measures:

- Maintenance of the present size of state-owned forests, and their potential increase by afforestation of state-owned arable land, and implementing the provisions of Act XCIII of 1995 on the reconstruction of protected natural areas.
- Establishment of an asset management form, which is most suitable for the public services of state-owned forests and their clear role in society, primarily in the case of forests subject to outstanding nature conservation and important for the conservation of biodiversity.
- In the area of private forests, attempts are required so that fragmented private forest owners should form joint estate communities under one undivided organisation, such as forest associations, forest co-operatives or other types of organisations suitable for professional forest management. Development of a private forest management system.
- Clarification of estates and land registry records.

Objective: Increase of forest land areas with afforestation and tree planting

Approximately one tenth – half a million hectares – of the land representing 70 % of the territory of the country and involved in agricultural use is suitable for afforestation. Afforestation, taking also into account nature conservation aspects, may significantly contribute to the improvement of natural conditions in Hungary and reduction of environmental damages. In certain cases, afforestation must return to pioneer tree species, i.e., native pioneer species in protected natural areas and the next phases – or even later phases – may introduce other tree species typical for closing a forest. Despite statutory regulations, semi-natural afforestation of native tree species is not supported to such an extent, which would be clearly preferable compared to afforestation with other tree species.

Required measures:

- Identification of areas rich in natural values, on which no afforestation is required in the future.
- Increase of the forest land areas of the country by afforestation on suitable agricultural and other areas bearing also in mind nature conservation aspects. In order to plant trees on the available 500,000 hectares by 2030, at least 10,000 hectares must be afforested each year.
- Wherever it is possible, semi-natural forests should be planted with variable Hungarian deciduous tree species.
- Putting in place conditions for planting pioneer forests with pioneer or transitional tree species.
- Improvement of the conditions of support for afforestation and tree planting with semi-natural native tree species.
- Recognition and financing of spontaneously afforested areas.

Objective: Development of a forestry communication strategy in biodiversity conservation

The conditions of forests can only be preserved and improved if society recognises the importance of forests and the responsibility that forests can only be protected with active involvement of the society and assuming liabilities. The forestry communication programme of nature conservation can only be implemented in close co-operation with the forestry sector. Joint actions are required against attempts for short-term economic gains, which are contrary to sustainable forest management and nature conservation.

Required measures:

- Development of a forestry communication strategy of nature conservation, conveying the role of forests in nature conservation to society and competent authorities and organisations.
- Discussions in the development of a common communications strategy in order to recognise the importance of forests and social liabilities involved in forest maintenance, in close co-operation with the forestry society and relevant organisations and persons.
- All activities should be based on a joint strategy and a jointly accepted programme, developed with the involvement of many groups of the society in the protection of forest biodiversity and preservation and development of functions, important for people.

Objective: Maintenance of big game stock, which does not endanger the protected natural assets and natural processes of forests

Games, especially big games, mostly live in forests, therefore the composition and number of games must correspond with natural game tolerance capacity in order to protect the ecological system of forests. One of the biggest obstacles of dissemination of nature-friendly forest management methods preferred in nature conservation is the excessive big game stock in our forests (deer, roe deer, wild boar and alien mouflon and fallow deer). In the Hungarian forests, the game stock is the only actual indicator for natural game tolerance capacity, based on which forests can be regenerated with nature-friendly methods, using one of the natural regeneration methods in most of our semi-natural forests without putting up fences.

It is necessary to reduce the number of artificially extended big games to a number that ensures long-term preservation of natural assets and natural processes of forests – primarily forest regeneration.

ACTION PLAN

The action plan collects the most important tasks related to the goals and objectives described in detail above, which are absolutely necessary for implementation. The tasks described below are closely related to target groups too.

- Development of criteria for nature conservation-type silviculture and semi-natural forest management in view of biodiversity.
- Development and revision of semi-natural treatment and management processes of each forest association, based on the results of experiments conducted for assessing natural processes.
- Periodic update of “Target stocks used in different site types” table and supplementing it with other native tree species target stocks, used in forests not used for economic purposes.
- Definition of conditions for reduction of invasive tree species and use of alien tree species on protected natural areas (with primary consideration to black locust and its use).
- Proposal for increasing support for semi-natural afforestation.
- Detailed indication of protected and unprotected natural areas, cannot be used for afforestation (review of the national afforestation programme in terms of nature conservation).
- Ordering public afforestation or tree planting around towns and cities, villages, housing estates, industrial estates, landfills, hospitals, holiday resorts, etc., where the damages arising from the deterioration or removal of a habitat can only be eliminated with afforestation or tree planting. Wherever it is justified by water protection, and for the purpose of protecting flood protection dams.
- Preparation for a conversion schedule for non-native and alien tree stocks on protected natural areas.
- Using natural regeneration in nature conservation management plans.
- Extended and continuous forest coverage maintaining forest regeneration and its accountability towards the forest authority.
- Use of forest tending and intermediary cutting methods in semi-natural forests on protected natural areas in order to increase the semi-natural character of forests, variable tree stocks and multi-species forests
- General use of regeneration cuttings in all forest stocks that are suitable for it.
- Stock maintaining use of trees and introduction of extended and extensive use of forests (selection and selective cutting, PRO SILVA method, small-area clear cutting) in suitable forests on protected natural areas.
- Elimination of management activities in forests that cannot be managed economically, and use of natural processes with special consideration to the preservation of endangered biodiversity components.
- On the basis of the outstanding natural values, shrub forests, gorge and scree forests, loess oak forests and oak forests on alkaline soil, juniper-poplar forests, willow and poplar bogs need to be removed from production among our natural and semi-natural forests.
- Cultural forests established on boundary areas, which cannot be managed economically (for example, bare rocks, sand) must be let to transform into natural - semi-natural forests

without human intervention, and the transition of the natural processes should be promoted within reason.

- In the case of forests situated on extreme locations the procedures required for the use of forests for nature conservation purposes should be simplified, by initiating legal regulations, and providing state-owned replacement areas to promote the withdrawal of these forests.
- Development and separation of technical criteria required for the separation of forests and plantations.
- Differentiation in the support system for forests and plantations – to increase support for semi-natural forests.
- Development of detailed nature conservation and landscape protection criteria in the use of forests for energy purposes and establishment of plantations for the same purpose.
- Protection of forest-steppe forests, representing outstanding values in terms of nature conservation and landscape history, and effective preservation of non-forest-type mosaic landscapes, forming an association complex with them (for example, forest-steppe shrubs, forest-steppe meadows, edafic grasslands).
- Development of nature-friendly regeneration procedures for forest-steppe forests (for example, establishment of pioneer forests) and acceleration of applicable research.
- Scheduled conversion of forests and plantations consisting of alien tree species on areas subject to nature conservation, and suitable for the establishment of forest-steppe forests into semi-natural forest-steppe forests and steppes.
- Protecting of opening forests from invasive species, development of a method to reduce these species in a nature protecting way.
- Preservation of the gene stock of trees forming forest-steppe forests and shrub forests, identification and selection of special draught resistant genotypes.
- Review of regulations of afforestation with native species (afforestation and regeneration) on weak and dry forest-steppe areas.
- Development of a support and accounting system to maintain and regenerate forest-steppe forests.
- Habitat reconstruction and water regulation projects to restore flow regime on flood plains wherever it is possible taking into account other factors.
- Protection of floodplain and bog forests, representing outstanding values for nature conservation and acceleration of research for the semi-natural regeneration of hard gallery forests (oak) on floodplains.
- Scheduled conversion of plantations of alien tree species on areas suitable for the establishment of floodplain and bog forests on protected natural areas into semi-natural forests and wetland habitats.
- Development of technologies and forest management procedure suitable for reducing invasive species.

Increase of diversity of forest subcompartment (stock) (so-called alpha diversity) and more variable structure of forest stocks require the following procedures:

- Occasionally stronger, elsewhere weaker thinning is required, but thinning should be omitted in certain places (spatial inhomogenisation).
- Thinning is required more often in certain forest subcompartments, and more rarely elsewhere (timely inhomogenisation).
- Final removal cuts must be executed in several stages, extended in time.
- The scope of cutting areas must be reduced further.
- Forest borders must not be treated.

- Shrub layer must be preserved without changes.
- Before final removal cuts, remaining trees and remaining tree groups must be appointed and left;
- Seed trees (more than one hundred and thirty years old) must be left everywhere.
- A few torn, thick, trunks of trees must be left unprocessed on site in each subcompartment.
- Smaller patches in forest subcompartments must be left untouched until trees fall out.

Increase of landscape diversity (so-called beta diversity), i.e., variation of the landscape requires the following procedures:

- Forest subcompartments must be formed in accordance with the existing habitats and forest borders of natural associations, so that their territory must be maximum 5 hectares, and should reflect the proper forest type.
- Extensions into the stocks must be planned and executed in each landscape when an operational plan is prepared.

Connecting corridor systems need to be planned and established at regional and country level (so-called gamma diversity) between forest patches and forest bodies, and finally the deterioration and decay of both forests and their surrounding areas must be prevented.

- Continuation of designating forests for protection.
- Review of reclassification between protection categories (strictly protected, protected).
- Integration of Natura 2000 areas into the National Ecological Network.
- Appointment of ecological and green corridors and their establishment in forest land areas.
- Reconstruction of protection level in forests.
- Identification of natural areas in forest land areas and announcement of the list of natural areas.
- Development of a common communication strategy with the forestry sector and relevant organisations and individuals in order to recognise the importance of forests, forest maintenance and social liabilities.
- Compilation of nature conservation management plans for forests, identification of clear nature conservation objectives.
- Introduction of long-term nature conservation planning and regulation.
- Co-ordination of management plans and district forest management plans; connection with the forestry planning system.
- Development of Nature Conservation Forestry Geographical Information System.
- Review of the potential use of alien reproductive material in the case of native species.
- Prevention of the release of genetically modified trees into the nature.
- Establishment of forest gene reserves.
- In order to achieve genetic diversity, the following tasks must be completed for species:
 - review of the genetic variability of our forest trees;
 - compilation of a national gene conservation programme for all forest species and its continuous implementation;
 - appointment of in-situ gene reserves for targeted (species-based) protection of economic tree species;
 - in addition to local protection, artificial introduction, establishment of (ex-situ) plantations and collections in the case of endangered tree species.
- Acceleration of research studying natural dynamic processes in forests.

- Completion of the establishment of forest reserves (review, extension) and continuation of the forest reserve research programme.
- Research of nature conservation forest management and nature-friendly forest management methods following natural processes outside forest reserves. Identification of sampling plots.
- Co-ordination and outstanding support of the activities of background institutions involved in nature conservation research activities.
- Permission of natural processes, monitoring of impacts of changes in forest conditions based on natural processes and nature conservation (forest) management activities.
- Review of the financing system of state-owned forests and development of a new financing system (integration of nature conservation and nature conservation-type social expectations).
- Development of a support system for public tasks in the case of community and privately owned forests.
- Payment terms and conditions for nature conservation assistance and compensation imposed in the case of forest management restrictions and bans ordered for nature conservation purposes.
- Participation in the establishment of a support system recognising nature conservation (forest) treatment and nature-friendly forest management activities.
- Re-assessment of the support system of forest regeneration and afforestation, and certain tree species in accordance with the changed legal regulations and nature conservation expectations.
- Development of an asset management form, which is most suitable for the public nature conservation functions of state-owned forests.
- Creating the conditions for organisational, personal and material conditions required for the operation of forests managed by national park directorates. Planned and cost effective forest management fully in line with nature conservation interests. Development of areas demonstrating exemplary forest management activities.
- Maintenance of a big game stock not exceeding the natural game tolerance capacity of forests. Further operation of the game damage observing monitoring system consisting of 10x10 metres small fences.
- Observation of the impact of changes in natural conditions of forests on the game keeping (game tolerance) capacity of forests.

INSTITUTIONS INVOLVED IN THE IMPLEMENTATION OF TASKS IDENTIFIED IN THE ACTION PLAN

Ministry of Agriculture and Rural Development and its institutions, Ministry of Environment and Water and its institutions, Ministry of Education and its institutions, Ministry of Finance, Hungarian Academy of Sciences and its institutions, West Hungarian University, Eötvös Loránd University, Forest Research Institute, media, non-governmental organisations.

IV. FISHERIES MANAGEMENT, FISHING, ANGLING

INTRODUCTION

The role of fisheries management, fishing and angling in biodiversity conservation is analysed regarding two main fields: natural waters and fishponds. Due to its specific characteristic, angling is handled separately.

Natural waters

Wetlands are the most threatened habitats of the world. There are several reasons for this, in case of Hungary drainage and filling-in should be mentioned. The decrease in wetland areas has been accelerated since water regulation.

The expansion of settlements and global warming also threaten the existence of wetlands. Therefore, their protection and where possible, their restoration are of great importance.

The quality, and the physical and biological state of our lake and river waters show varied conditions, and in a number of cases, the environmental and human impacts have fundamentally transformed the characteristics of habitats, and the fish stock of our rivers and lakes. Under the provisions of the Water Framework Directive, when defining the good ecological status desirable in case of our natural waters, the presence of a fishstock (composition of species, distribution of age) defined as close to the ideal by comparison to the reference water bodies should be ensured. The preservation, management of fish stock, improvement of its composition, organisation of catching and the increase of yields can only be implemented by planned fish management. In the course of this activity, however, intense attention should be paid to close-to-nature states, and aspects of environmental protection and nature conservation.

The fish production sites, natural waters (rivers, streams, backwaters, natural lakes, etc.) artificial fish ponds and reservoirs currently available in Hungary for fish production are not of equal quality from the point of view of fishing and fish production. At the same time, the biological productivity of our waters is finite and irreversible damages may be generated in our natural assets unless management is adjusted to these characteristics. For that reason, great attention is paid to the exploitation and protection of fish stocks and habitats in many of the countries of the world.

Due to introduction and non-desirable immigration of species, our natural waters are full of alien fish species, what is more, other introduced organisms have also recently appeared, which is a serious problem in terms of protecting our native wildlife and biodiversity.

Fishponds

In Hungary we have more than 250 fishpond systems, the total area of which in Hungary is over 30,000 ha. A characteristic feature of their geographical location is that the larger part of the total fishpond surface can be found in the proximity of the Tisza River, while in Transdanubia a large number of smaller systems can be found. Most of the ponds were established on the site of a natural marsh or temporarily water covered area. It is partly due to this and partly to the progress of succession that the fauna and flora of some of the pond systems are close to the species diversity of natural marshes, and the number of individual plants and animals to be found there are often in excess of the previous. Fish ponds are the water

surfaces that have preserved in small spots on the Great Plain the aquatic biosphere historically characteristic to 25% of our country's territory. The maintenance of the existing ones and the establishment of new ones is an important task.

Fish farming in Hungary, as a form of extensive farming, is expressedly desirable especially in regions with poor soil conditions. Fishponds have immense importance even beyond these as they retain water in some arid regions. In the drought period of the last decade, the retention of waters by any method has become a fundamental interest of agriculture. If there was more water on the Great Plain a former farming method characterised in the first place by natural tree species and more sophisticated plant cultures could be applied.

Therefore, loans used for agricultural development should be allowed to be used for the establishment of new fishponds. It is especially important however that prior to the selection of the site of the fishpond to be newly established, a thorough natural assets inventory should be made.

Angling

Fishing and angling in theory differ only in terms of the fish catching method, but from the point of view of biodiversity conservation they are fundamentally different activities. For angling purposes, artificial fishponds and mine pits of small area are also suitable, while for fishing, only natural waters and fish ponds are suitable.

These days, the number of anglers in Hungary is fluctuating in between 300-350,000. The large number of anglers causes an inadmissible pressure on some of our natural waters. In some places, where fishing and angling are present simultaneously, a conflict that appears to be irreconcilable has developed between the parties, for example in the case of Lake Balaton and Szigetköz, etc.

STRATEGY

Reducing the pollution of Hungary's natural waters and elaborating the method necessary in the interest of its implementation is a priority strategic task. The so-called good ecological status defined in the Water Framework Directive can only be achieved with the active participation of a stakeholders. With the rising standard of living, the pressure on natural waters and the number of anglers are expected to increase.

In the interest of implementing all the above objectives, the following tasks are ahead of us:

- proper legislation is needed to ensure that new alien aquatic organisms in the country should not pose a risk on our waters by way of introduction;
- the method to remove the most hazardous alien species from our natural waters should be developed (e.g. silver carp, Prussian carp, etc.);
- care should be taken to enable the natural waters gravely transformed and separated from their banks/shores to regain their morphological diversity that would facilitate the reproduction of the most different fish species and thus promote the conservation of natural fish fauna diversity.;
- conditions for the conservation of species diversity and the maintenance of healthy fish compositions in our natural waters of large extension should be created.

Objective: Conservation of our natural waters' biodiversity

Some of our natural water systems are still free of alien fish species presenting the largest hazard. Provisions must be made to ensure that the 'purity' of these waters will be continuously maintained.

Fisheries management methods based on ecological approach and taking into account the aspects of biodiversity conservation should be elaborated for the wetland habitats having a settled ownership and fishing rights.

In order to protect aquatic ecosystems and natural water fish populations, the statutory prohibition of fish poaching should be enforced in practice, and meanwhile the necessary financial, personal and technical background should be created.

The wetland habitats found on nature conservation areas and used for fishing purposes should have well founded fisheries management strategies.

Objective: Improving the state of natural waters

Provisions should be made in order to significantly reduce the pollution of living waters and polluters should pay not only a fine but should also be obliged to cover the costs of 'restoration'.

Objective: Rehabilitation of wetland habitats with attention to utilisation for fishing purposes

From among all habitats types, the area of wetland habitats and water-covered areas have decreased most significantly due to landscape transformation carried out in the past centuries. For that reason, besides for instance creating the flood safety of the Tisza River on the basis of new principles, provisions must be made in order to facilitate the rehabilitation of the natural spawning sites of the river fish in the flood plains by the re-generation of the former steps system (water release and retention system) and by the elimination of the ditches and lowlands having the effect of traps.

Where it is possible, the water flowing away from the fishponds should be distributed in the vicinity in order to maintain the wetland habitats there.

The waterlogged areas along the surface canal system and areas that could be potentially converted into and operated as semi-natural spawning areas should be surveyed and after having obtained the relevant data, the schedule of necessary interventions for their establishment and operation should be planned.

Objective: Creating conditions for angling subject to biodiversity conservation

Fishing and angling in natural waters must be optimised in line with the biological productivity of waters, if necessary, by applying quotas and limitations on the number of fishers or anglers. It must be ensured that the arrangement and operation of the angling sites are in compliance in all respect with the legal regulation in force and their establishment and operation in particular do not cause a further pressure on the shore zone.

ACTION PLAN

The interests of biodiversity, long-term economic fishing, fish production and the considerations of implementation are compatible and point to the same direction. The detailed implementation plan, including the following basic tasks, should be built up by handling these common issues as priorities:

- The legislation supporting the objectives enlisted in the strategy must be created, including in particular:
 - the creation of legislation ensuring that new alien aquatic organisms cannot pose a risk on our waters by way of introduction;
 - amending the relevant legislation in order to significantly decrease the pollution of our living waters and the polluters pay not only a penalty but should also be obliged to cover the costs of 'restoration'.
- The provisions of the Water Framework Directive must be implemented.
- Areas where rare, threatened fish species and fish species under protection occur and their habitats (biotopes) must be preserved, the potentials for their efficient protection must be explored, and related legal regulations must be made more stringent.
- The fish species composition of small watercourses and unique habitats (alkaline areas, bogs, mountainous and lowland streams, etc.) must be explored and their efficient protection must be provided.
- Artificial propagation methods must be developed for fish species that are economically not significant but have high natural values, are rare or threatened fish species, in order to facilitate the re-introduction of such species to their former habitats.
- The waterlogged areas along the surface canal system should be surveyed as areas that could be potentially converted into and operated as semi-natural spawning areas, and after having obtained the relevant data, the schedule of necessary interventions should be planned.
- A detailed programme should be elaborated to provide a method and implement it on the removal of the most hazardous alien species (e.g. silver carp, Prussian carp, etc.) from our natural waters, and the necessary sources for this should be provided.
- Comprehensive calls for application must be elaborated, also with attention to the European Union resources available, for the realisation of different habitats reconstruction tasks, in particular
 - the rehabilitation of natural waters severely transformed – separated from their banks/shores – in order to help them regain their morphological diversity which would ensure the reproduction of the most different kind of fish species and promote this way the conservation of the natural fish fauna diversity;
 - the rehabilitation of the natural spawning sites of watercourse fish species on the floodplains by the regeneration of the former steps systems (water release and retention system) and by the elimination of the ditches and lowland areas having the effect of a trap.

Fishponds

- The proper maintenance of fishponds and, possibly, establishment of new fishponds is a significant task due to their outstanding role in the conservation of biodiversity.
- A detailed methodology of fisheries management should be elaborated with the participation of the ministries and farmers concerned.

Angling

- The number of anglers on some of the natural waters must be significantly limited. Authorities must provide continuous inspection.
- Fishing and angling must be regulated, if necessary also by applying quotas and limiting the number of fishermen/anglers.
- The statutory prohibition on fish poaching must also be enforced in practice, and the necessary financial, personal and technical support must be made available.
- The major water uses currently loading certain wetland habitats should be reviewed, and the related permits must be updated in accordance with the act on nature conservation.

INSTITUTIONS CONCERNED WITH THE IMPLEMENTATION OF THE TASKS IDENTIFIED IN THE ACTION PLAN

Ministry of Agriculture and Rural Development and its institutions, Ministry of Environment and Water and its institutions, Ministry of Health and its institutions, Ministry of Education and its institutions, Ministry of Finance, Hungarian Academy of Sciences and its institutions, Szent István University (Gödöllő), Debrecen University, Hungarian Fishfarmers' Association, Hungarian Anglers' Federation, media, non-governmental organisations.

V. AGRICULTURE

INTRODUCTION

62.9% of Hungary's territory is used for agricultural purposes, closely interweaving arable crop production, plant cultures, meadows and pastures and animal husbandry with biodiversity and the structure and use of landscape. Together with the area of forests, reedbeds and fisheries, agricultural areas amount to 83% of Hungary's territory.

Our domestic agriculture cannot be substituted by other sectors of the national economy. This affects agriculture's space for movement with regard to the conservation of biodiversity just as the general status of national economy and the probable financial sources.

Only that strategy can be considered for implementation that pays equal attention to people's daily subsistence, Hungary's short term economic targets and the efforts for the conservation of biodiversity serving society's long term interests, that is, agriculture's multifunctional nature.

It is especially important to extend the approach of the conservation of biodiversity to also cover the border areas of natural and cultivated vegetation, arable lands, grasslands, vegetable and fruit cultures, vine plantations, extensive farming systems, and all other small gardens, gardens around the house areas, and gardens for pastime purposes.

STRATEGY

Diversity is a fundamental pre-requisite to balanced, environmentally friendly farming sustainable in the long term and to harmonic environment/land use. It should be extended to cover the following areas:

- biotope diversity which structures the space in a sophisticated manner in line with the landscape character and provides habitats for a spontaneous species diversity,
- species diversity living in nature, that is, the diversity of micro and macro organisms, plants and animals living and spontaneously occurring in cultivated and undisturbed areas,
- cultivated species diversity, that is, the diversity of cultivated crops and animal species that have been bred occurring on the level of indigenous landraces and culture variants,
- genetic diversity, that is, the preservation of the gene stock, the genetic substance of life on earth that ensures adaptability and survival.

All this can only be attained if the diversification of agriculture is extended to also cover:

- land use diversity, that is, the diversity of the farming sectors, land use types and forms;
- diversity according to the rate of intensity;
- the diversity of the farming system.

Objective: Making the environmentally sustainable agro-environmental management general

In many regions of the world and of Europe in particular, the role of the rural landscape and environment and its concept has undergone a significant change due to the spread of the eco-social market economic model in the past 15-20 years. One had to realise that the rural countryside is a scene not only of agricultural production, but it is also the biological and social space of living, and in case our interventions are driven only by the increase of production efficiency, this space of living may get into serious trouble.

One of the crucial principles of sustainable agricultural development is the provision of long term protection of natural resources. The protection of natural resources and systems and food safety emerge presupposing and strengthening one another. The principle of the strategy and the fundamental motive of the image evolving about our country should be the motto „healthy and safe foodstuffs of special quality from a clean environment of diverse biosphere”. The environmentally friendly farming is a new opportunity not only for the maintenance of our natural assets and biodiversity, but it may also enhance the development, employment and social security of the rural areas by the promotion of transformation of the production structure (afforestation, plantation of grasslands, landscape management), of recreational developments (village, agro and eco-tourism) and of the production and processing systems producing high added value requiring live labour.

Our country's excellent production potential must be exploited to produce high quality products and goods, but agriculture must also fulfil other tasks in addition to production. Agriculture and forestry are the prime users of the cultivated landscape, the fundamental tool for preserving and developing the countryside in Hungary. This is why on the one hand cooperation with agriculture is essential for nature conservation, while on the other hand, the performance and results of farming dominantly depend on the state and quality of the environment and the natural resources. Due to the reliance of nature conservation, agriculture and the rural areas on each other, the coordination of these three areas is unavoidable.

Taking into account the objectives, tasks and multifunctional nature of sustainable agriculture, its prime components and main elements may be the following:

- production of products with good quality characteristics and with no residues;
- economical use of non-renewable raw materials and energy;
- reducing and/or avoiding environmental pressure on the soil, water and air;
- fostering the cultivated landscape and maintaining biodiversity;
- preserving the countryside's cultural and agro-cultural values;
- providing employment opportunities and acceptable revenues for the largest possible number of people.

It seems that the kind of farming that has been in practice so far – industry scale farming with high (fossil) energy consumption and chemical use, focusing from among agriculture's purposes solely on mass production and the return of capital - is less suitable for finding simultaneous solution for the above tasks. The multifunctional agriculture embedded into the eco-social market economy requires other solutions than what is offered by the strongly chemical, industry like system.

The tasks of „multifunctional” agriculture, environmental and landscape management can be classified into two large categories:

- production tasks fundamentally regulated by the market, that, in addition to food production, increasingly include the production of non-food products (renewable raw materials, energy sources), and
- environmental, social and cultural tasks related to the region, the landscape, the land.

These latter functions represent public assets – food safety, fostering the cultivated landscape, maintaining biodiversity, preserving the social and biological space of living, maintaining ecological infrastructure, stability of the ecology, maintaining the population, balance of workforce, providing the foundations for guest reception and tourism, fostering the

values of peasant's life – that cannot be regulated by the traditional market tools, the prices. But they play an increasing role in maintaining the balance between the society and the environment of rural areas, therefore, society must recompensate these services by direct payments.

With attention to all this, the biodiversity strategy will have as its prime focus the development of an agricultural practice that is based on the sustainable use of natural resources, the conservation of natural values and biodiversity, the protection of landscape values and the production of healthy products. The following objectives are identified for the implementation of the above:

- broad scale dissemination of environmentally friendly agricultural production methods in order to preserve and improve our natural assets, biodiversity, and the state of our landscape, soil and water supplies;
- increased professionalism in plant protection, broad scale dissemination of integrated plant protection, supporting organic farming, limitations on excessive application of pesticides;
- contribution to the development of a sustainable land use and rational land use system of agriculture, and a balanced and stable land use and production structure adjusted to Hungary's agro-ecological features;
- increased production of marketable, excellent quality, valuable products whereby agriculture's export potentials are improved;
- extension of the employment and revenue generating potentials in the rural areas, contribution to the improvement of the quality of life in the rural areas, generation of alternative opportunities for making revenues;
- improvement and exploitation of the potential of tourism primarily by improving the rural areas, the landscape, and by the improvement of the conditions of eco-tourism, village tourism;
- contribution to the success of other rural development measures, to the improvement of knowledge of the rural population on production and environment, and to the promotion of the conceptual change;
- strengthening the role of training and education, bringing up a new generation of modern agricultural intellectuals, identification of the new aspects of secondary and higher (graduate and post-graduate) education.

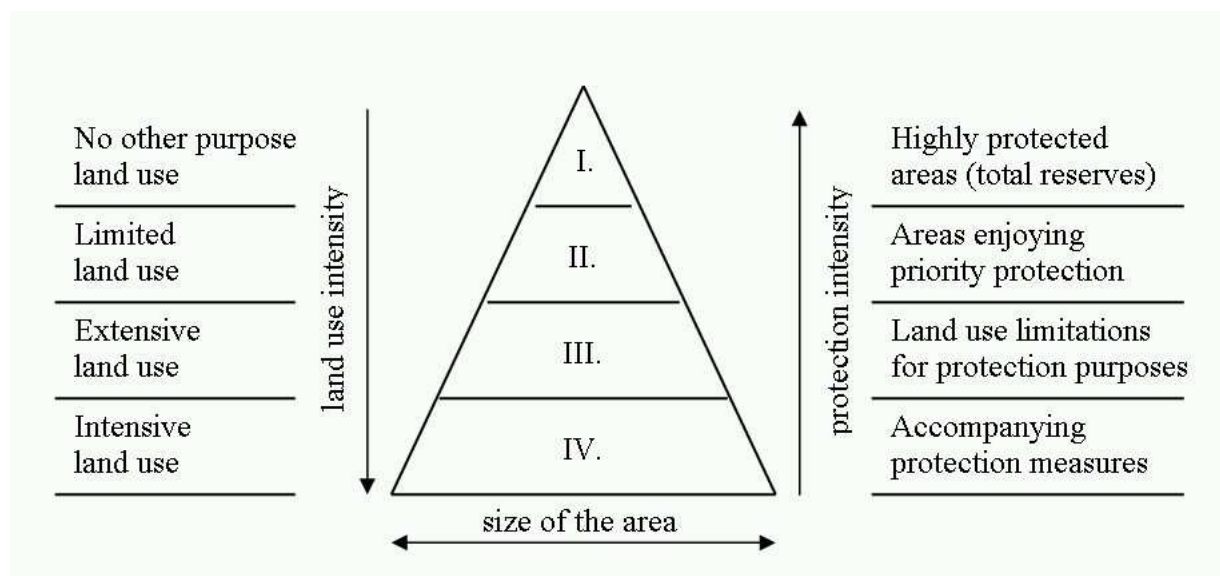
Objective: Improvement of the landscape and land use systems

This Strategy can be described via the so-called soil use pyramid. Its far reaching objective is to integrate land use and nature conservation, and determine exploitation and conservation intensity and their respective proportions in line with the landscape characteristics. This is the approach that uses the landscape characteristics as a starting point to create a harmony of the two endeavours and thereby makes possible to adapt to the environment and maintain biodiversity. After merging the needs of nature conservation and agriculture, the land use zones of this system can be the following:

- At the top of the pyramid are the areas of varying size in the different regions that obviously must be nature conservation areas (national parks, landscape protection reserves, strictly protected parts of nature conservation areas, core areas of biosphere reserves, etc.) with the full exclusion of all other land use purposes.
- Below this, other protected areas - buffer zones surrounding the core areas - are situated with an agricultural land use of nature protection focus.

- Under this level, transitional areas requiring certain land use limitations (e.g.: water protection areas, buffer zones, etc.), extensive agricultural zones can be found.
- Finally the broad base of the pyramid is a farming zone with an intensity dependant on soil characteristics, but environmentally friendly, adapted to its environment and production area.

Its extension upwards depends on which region the given area can be found in (in an agricultural land of high farming capacity or a landscape of high nature conservation and small farming capacity). The rate of intensity is determined by the area's environmental capacity and the environmental sensitivity of the assets under protection.



Therefore, the system harmonising nature conservation with the aspects of land use for other purposes may have the following categories:

Area/ function	Land use of other purpose	Status	Nature conservation	
			Objectives	Objects
1. Protection	None	Total reserve (possibly state owned)	Protection of species, biocenoses, biotopes, natural equilibrium.	Plant and animal species included in the list of protected species, and habitats.
2. Land use limited by protection priorities	Limited	Water protection, landscape protection, protected landscape components	Protection of natural assets (soil, water, plant and animal species).	Surface waters and their areas along their banks/shores, sub-surface waters, soils, marshes, wet meadows, dry grasslands, semi-natural forests.

Area/ function	Land use of other purpose	Status	Nature conservation	
			Objectives	Objects
3. Land use	Ordinary and with attention to nature conservation objectives	Cultural landscape	Maintenance of landscape character and preservation of ecological functions.	Live hedges, forest zones, rows of trees, fringes of fields, forest fringes, fine structures.

Objective: Development and dissemination of farming methods and production area models protecting biodiversity

The so-called extensive agricultural systems play an especially important role in maintaining biodiversity. In Hungary the following, usually extensive farming methods significant for nature conservation are used:

- Grassland management systems,
- Arable land systems,
- Traditional plantations,
- Mixed farming systems,
- Aquaculture,
- Reed management,
- Homestead farming,
- Organic farming.

Objective: Changing arable crop production and crop system to improve biodiversity

The key areas, major components of sustainable, environmentally friendly agriculture in arable crop production are the following:

- Development of a land use and spatial structure aiming at the conservation of biodiversity and the harmony of spatial functions, the ecological harmony of sectoral proportions,
- Doing things on a human scale, changing the operational and field sizes, restructuring the space according to ecological, soil protection aspects, traditions, cultural-ecological aspects, landscape, aesthetic, economic, production related and technological aspects;
- Using agro-ecosystems built on circular processes;
- Adaptation to the landscape and production sites in the following major areas:
 - development of a management structure appropriate for the landscape, using plant species and variety structure fit for the landscape, their association and adjustment into the crop shift, crop rotation (colourfulness instead of e.g. monoculture);
 - application of differentiated agrotechniques for natural large landscapes and landscapes (tillage, soil protection, soil nutrient management, fertilization, sowing, maintenance, plant protection, harvesting) as fully adjusted as possible to the varied agro-ecological features;
 - Creation of a harmony between the varied ecological animal keeping capacity, plant production and the animal stock of different landscapes.
- Making the peasants, the rural population environmentally conscious farmers.

Objective: Development of horticultural plant production with a focus to enhancing biodiversity

Nowadays, the largest number of variety loss can be observed in the major sectors of horticulture, which inherently includes the danger of losing the genetic substances of our domestic cultivated plants. Compared to the former 350-400 varieties of 80-90 species produced, currently we are producing only 250 cultivars (varieties) of not more than 40 vegetable species. It is necessary to support the production of varieties adjusted to the production regions.

With respect to medicinal herbs, collection of herbs must be limited in order to protect the natural vegetation cover and medicinal herbs producing farms using a bio-approach should be established primarily in the proximity of the national parks, and protected natural areas.

Similarly to wine producing regions, the production of fruit producing plants should happen in the regions appropriate for them, as it is required by both the special ecological needs of the species and cultivars and the diversity of the natural factors.

Objective: Developing animal husbandry with a focus to maintain biodiversity

The original gene stock of varieties of foreign origin is available in their countries of origin, their maintenance and preservation as reserve gene stock is realised there. The situation is different in case of livestock varieties with specific origin in Hungary, that is, native or endangered. Although their quantity related production figures are behind those of the unilaterally specialised varieties, but their quality related production parameters often exceed those of the latter. The traditional, native and adapted Hungarian varieties constitute a significant gene stock, therefore they should be preserved. Their varieties can only be maintained with state support.

Objective: Mitigation of the impacts of human intervention and droughts, floods and inland waters on biodiversity

Water saving farming, the transfer of natural precipitation into the soil and its preservation presupposes proper tillage and the necessary tools (ploughs, heavy rollers, subsoil ploughs, etc.). In addition to applying precipitation retaining technologies, it is also necessary to use drought tolerant varieties, to mitigate wind's evaporating effect by rows of trees, hedges, and of course to extend the use of water saving irrigation. For that reason, this strategy supports the use of those forms of farming that also protect biosphere.

Floods and inland waters have turned out to be such a serious issue due, for the most part, to industrial scale, improper, robbery kind of management of the land use system, human negligence and lack of expertise. The role of droughts and floods and inland waters in nature and agriculture has to be treated separately. In areas where there is no valuable wildlife but agriculture is important, the interests of agriculture have to be given priority, and the irrigation or the drainage of surplus water has to be subordinated to this aspect. In areas, however, where wildlife is valuable, the agricultural land use issues have to be subordinated to nature protection interests. That is, in case an agricultural area stricken by inland waters can

be found in the vicinity of valuable aquatic, marshy, or boggy biosphere, there, instead of drainage, farming cultures of high water demand have to be established (e.g.: fishponds, etc.).

Objective: Conserving the biodiversity of the Natura 2000 sites through the agricultural support system

The Natura 2000 network mandatory for the Member States to designate under the Birds and Habitats Directives of the European Union serves the conservation of biodiversity also in the agricultural areas. The fundamental components of this network provide us an opportunity to assess the effects of agricultural activity, or to protect the natural values parallelly developed with the agricultural activities. For that purpose, on the Natura 2000 areas limitations can be enforced on agriculture, depending on the primary nature conservation priorities of the given area. The Common Agricultural Policy of the European Union lays down the foundations of the compensation for agricultural limitations with nature conservation focus on the Natura 2000 sites. The characteristic tendency of the recent years is that the issue of financing the Natura 2000 sites is given an outstanding priority in the redistribution of the agricultural sources of the Union. The elaboration of the subsidy system adapted to our domestic conditions is in process during which the development of the adequate position of nature conservation and its consistent implementation is indispensable from the aspect of social acceptance and effective operation of the Natura 2000 network.

Objective: Change of direction in agricultural research and development

To cover all the three large areas of agriculture (ecology, biological bases, technology), interdisciplinary research programmes with a system approach (holistic approach) are needed. These are intended to find and explore the best solutions not only of one discipline of science, but are aimed at the development of systems that in total fulfil the requirements of sustainable agriculture, ensure the equilibrium of the environment and the maintenance of biodiversity.

Objective: Encouraging a change of direction in economic policy

We need an agricultural, rural and regional development policy that enforces the needs of sustainability, multifunctional agriculture and quality orientation in its broader sense. These will need to be specified in the financial and financing policy, production and market policy, property and operational structure policy, and in the human development policy.

Today, agricultural policy is no longer only production policy, but at least to the same extent, it is also environmental and rural policy. The European model of agriculture is based on these recognitions. What was identified in the National Agro-environment Programme has also been incorporated into and is further pursued in the agro-environment management measures of the National Rural Development Plan. Without this framework, the biodiversity conservation strategy of the Hungarian agriculture becomes void, therefore it is necessary to closely interlink the two strategies to enable the agricultural-environmental management to provide the sources for the dissemination of agricultural systems that protect biodiversity.

ACTION PLAN

- Elaboration of a new agricultural policy. In this policy, environmentally sustainable agricultural development, the multi-functional European agricultural model embedded into the eco-social market economy, environmental and landscape management, and quality improvement orientation understood in the broad sense must be placed in the focus.
- A new act on agriculture should be created that handles agricultural priorities in the narrow sense equal to the values formulated in the National Environment Protection Programme, the Agro-environment management measures of the National Rural Development Plan, and the National Strategy and Action Plan for the Conservation of Biodiversity.
- A valuation and continuous monitoring system of the natural assets must be elaborated, as well as an ecological form of the taxation system that shifts public burdens from live labour to material, energy and environment/nature exploitation.
- A screening system must be elaborated that examines and qualifies the development programmes, technologies and investments from the aspect of sustainability and biodiversity conservation and can be used in the environmental impact assessment of investments and in the environmental study of plans and programmes.
- The tasks aiming at the conservation of biodiversity must be incorporated into the agro-economic and rural development programme of the Ministry of Agriculture and Rural Development. The National Agro-environment Programme affecting biodiversity and its agro-environmental management process and the system of Sensitive Natural Areas must be extended, fully implemented until the end of the decade, and the necessary finances must be separated in the Ministry's budget.
- To win society's support, a large scale information campaign must be launched.
- Higher attention than what has been shown so far should be given to support the agricultural institutions that undertake to set up and take care of environmental management agricultural courses on secondary school and higher education level, and graduate and post-graduate training courses and doctoral schools.
- The expected impacts of the change for the environment-oriented production structure accompanying our accession to the European Union must be analysed. A number of changes can be expected relating to investment and technology: of these, background studies have to be made. Care should be taken to elaborate and disseminate farming systems and production site models serving biodiversity.
- On account of implementing the strategic tasks described under the points above, the National Biodiversity Monitoring System needs to be strengthened. A national survey must be taken of the endangered species and varieties of the cultivated plants and bred animals. Measures should be initiated to stop the spread of invasive species in the cultivated landscape. The above activities must be coordinated with the objectives of the agro-environmental management measures and must be brought in line with the monitoring of the agro-environmental management measures operated by the Ministry of Agriculture and Rural Development.
- In relation with the National Ecological Network Programme, withdrawal of areas from cultivation not suitable for this purpose on the basis of the Land Use Zonation Programme, and, creation of a biotopes network by attaching them to the existing valuable biotopes, and the launch of the extensive farming and environment rehabilitation programme.

- On the basis of the comparison of the agro-potential and environmental sensitivity of the areas, the change for the proper type of cultivation with adequate rate of intensity should be encouraged and necessary funds must be earmarked.
- Priority support must be provided for the extensive farming systems pursued on integrated, ecological, and wetland habitats and grasslands, and for the mosaic type, small scale forms of farming (homestead farming etc.).
- Native Hungarian varieties must be collected, preserved in gene banks and maintained. It is necessary to collect regionally the historic varieties, to maintain and operate the collection, set up an inspection system, and create a registration system. Breeding programmes should be launched based on these gene banks as we need highly selected landraces that are most adapted to the agro-ecological features of the given production district.
- The collection and preservation of the relative species of cultivated plants and of the native Hungarian varieties, varieties that are being withdrawn from overall production, hybrids, ecotypes, and landraces need to be strengthened.
- Elaboration of a National Gene Conservation and Breeding Programme.
- Dissemination of chemical saving and integrated plant protection methods. Although we are a Member State of the European Union, it is justified to maintain our more stringent authorisation requirements.
- It is a task for the authorities to prohibit the use of technological items and methods that cause damage to the wildlife (e.g., burning of straw and stem residuals, sides of ditches, use of a rotary lawn mower) and to inspect compliance.
- It is an important task to define secondary associations related to fruit producing plantations and vineyards and to determine their technological sensitivity and stability;
- Courses, presentations should be delivered on all the tasks contained in the action plan and the expected results.

INSTITUTIONS CONCERNED WITH THE IMPLEMENTATION OF THE TASKS IDENTIFIED IN THE ACTION PLAN

Ministry of Agriculture and Rural Development and its institutions, Ministry of Environment and Water and its institutions, Ministry of Education and its institutions, Ministry of Finance, Hungarian Academy of Sciences and its institutions, Szent István University (Gödöllő), Budapest University of Economics and State Administration (Faculty of Horticultural Science), West-Hungary University, Debrecen University, Kaposvár University, media, non-governmental organisations.

VI. REGIONAL DEVELOPMENT AND TOURISM

INTRODUCTION

The conservation and sustainable use of biodiversity must be considered in all human activities. This is applicable to regional development (including the tools of regional planning) and tourism as well. Before anything else, it seems to be necessary to give the reasons why these activities should be examined combined, yet separated when it comes to the elaboration of the subject matter. With regard to a region's features and potentials, tourism is only one of the economic sectors that has become a recognised and significant regional development factor. It deserves special attention as these days it is one of the largest and at the same time most dynamically growing sector of world economy utilising also natural resources that have so far not been affected by agriculture and industry. As a consequence, its impact on biodiversity (which may be favourable, unfavourable or neutral) is gaining more and more significance. At the same time, tourism cannot be classified into any of the traditional sectors, as in essence it is connected to each sector. This all-embracing character is the most common feature shared by both regional development (a functional activity) and tourism (an economic sphere), which is the reason for the combined discussion of the two.

Tourism is based on – in addition to the availability of free time and free income – the need of humans for diversity that induces them to temporarily leave their permanent environment and that is expressed in different motivations to travel. From among the destinations of tourism the consumer will choose the ones that offer attractions best suited to their motivations. Thus, natural and cultural diversity, preservations and maintenance of traditions are prerequisites to the existence of tourism both from the aspect of the tourist and the receiving areas. Tourism is related to regional development in several respects: it is able to utilise the natural and cultural assets (attractions) of a region in case tourists get information about them (marketing), they are accessible (transport) and they find all the services and conditions (accommodation, meals, entertainment facilities, other services, public security, etc.) that they need to fulfil their needs.

STRATEGY

Objective: Regional development

The regional development strategy has in its focus the National Regional Development Programme and the National Regional Plan facilitating the coordination of the regional development activities of the regional and local communities with the national objectives. In accordance with that, on the basis of mutual benefits, the national regional policy should enhance the coherence of the regions' regional planning and regional policy with the European Union's regional policy.

Its priority task is the improvement programme of the regional development system and its approximation to the practice of the European Union. The practice of regional development should enforce:

- the decentralised regional development policy;
- systems operating in a transparent manner based on partnership;
- programmed development practice;
- improvement of the ability for planning and coordination.

Included in the comprehensive strategy of regional development, the main objectives related to the protection of biodiversity in practice are the following:

- Provision of the conditions of a healthy environment, reduction and elimination of impacts harmful to or threatening human health.
- Preserving the semi-natural status of the living and non-living environment, the protection of the natural systems and natural assets, maintenance of biosphere diversity.
- Consideration of the principles of sustainable development in the management of natural resources. Economical and value protecting management of the natural resources of crucial importance. Application of the compensation principle or rehabilitation in case of the unavoidable habitat loss (e.g.: road construction).
- In the context of the above, realisation of a harmonic relationship between economic development and the environment aiming at a rational utilisation of the environment and the least possible environmental damages.

Objective: Tourism

The priority objectives related to the conservation and sustainable use of biodiversity are as follows:

- The protection of the intact natural environment and the level of biodiversity is a priority task and responsibility for both tourism as a sector and its roleplayers. It is advisable to promote this by applying the proper legislation, incentives, information, education, training, inspection and sanctions.
- The different forms of ecotourism (in particular, the presentation of parts of protected natural areas suitable for that purpose, using visitors' centers, demonstration sites, study paths, camping, cycling, aquatourism, cave tourism, medicinal tourism, etc.) should be included among the exclusive touristic products having priority for improvement. Ecotourism could be linked with the different potentials of village tourism (e.g.: gastronomic tourism, wine tourism, accommodation in villages, organic farming and products, folklore programmes) as well as with free time and sports tourism (e.g.: angling, hunting, adventure tourism, horse riding). In the incentive system serving the improvement of tourism, attention should be paid to the specific features of these forms, especially to the fact that the allocation of a higher subsidy ratio is justified in case of developments serving the protection of biodiversity. It is applicable in particular to ecotourism pursued on protected natural areas where a significant part of the produced profit must be returned to maintain and protect the areas and their values. The organisers of ecotourism should have ecological education and awareness raising.
- The dissemination of environmentally friendly operation methods and standards of conduct should be promoted at the different touristic organisations, the major methods of which are on the one hand training of the management in this direction and on the other hand encouraging the professional organisations to adopt or elaborate and disseminate such codes of conduct, to announce prizes or call for application for prizes like Eco-label in the European Union, the Green Globe Award, or the Green Hotel, etc.).
- When the tourism target funds are allocated, priority must be given to financing the elaboration of tourism's technical development concepts and product development projects on national and regional level, as without them no conscious development can

be implemented. When elaborating the national and regional development plans, the requirement of double integration must be respected: on the one hand, tourism must be integrated into its natural and social environment, on the other hand, all the other sub-sectors included in tourism (attractions, transport, accommodations, catering, entertainment, agency services, hygiene, public security, information supply and other non-profit services) must be further improved in coordination with one another. It is advisable that planning is done by multidisciplinary groups (including touristic experts, ecologists, engineers, economists, etc.) and continuous cooperation is established between the regional development and touristic organisations. Significant achievements have already been made concerning the latter aspect. Considering that sustainability and the protection of biodiversity are relatively new concepts and the related agreements, rules and experiences are continuously changing, it is justified that in the process of planning, implementation and operation, in addition to national legislation, continuous attention is paid also to the requirements and recommendations of international organisations, and the international conventions ratified by Hungary and the international experiences, the cooperation potentials, and the recommendations of the Budapest Declaration. It is important to support the related research work with special attention to the ones dealing with the impacts of tourism on Hungary.

- Elaborating the share of nature conservation and other sectors concerned from the revenues of tourism and elaborating the support for initiatives taking part in the conservation of biodiversity.
- Elaboration of a system of conditions and qualification for ecotourism and the education, training and technical/expert system of education.

Objectives of touristic development in Hungary

Main objective: creation of a sustainable, environment and nature friendly tourism that is competitive on the European market

Natural, social, economic and technical partial objectives

Nature	Society	Economy	Tourism
1. Preservation and protection of intact natural environment. Developing ecotourism.	1. Long term and safe living for an increasing number of the population.	1. Achieving continuously increasing personal, corporate and public revenues.	1. Sustainable development. Improvement of exclusive tourism as a priority.
2. Rehabilitation of damaged environment. Restoration/conservation of good water quality of Lake Balaton, other lakes and rivers in compliance with the European Union hygiene norms.	2. Improving the population's quality of life by the further development of the forms of pastime suitable to enrich one's personality. Boosting domestic tourism and the community life of settlements.	2. Income from international tourism contributes to national economy development. Multiplication effect on the other sectors of economy.	2. Satisfied tourists, well operating, fair and profitable touristic sector.

3. Supplementing the infrastructure deficiencies (waste water treatment, up-to-date waste management, protection against noise, etc.) on resort places.	3. Protection of cultural heritage combined with utilisation. Reviving local traditions.	3. Realisation of an economic policy that takes account of the real sphere, and that treats tourism as it fit for its economic role.	3. Formulation of a professional conduct having a consumer oriented, environment and nature friendly and, at the same time, marketing focused approach.
4. Provision of areas for touristic purposes that are not under proper nature conservation and cannot be utilised more efficiently for other purposes.	4. Creation of an up-to-date education and vocational training system. Teaching on tourism in the primary and secondary education.	4. Recognition of state's responsibility for tourism. Upgrading the economic structure.	4. Developing the human resources. Improving the technical and foreign language command and the culture of behaviour.
5 Performance of preliminary environmental impact studies with regard to tourism and establishment of limit values of environmental loading as part of the development of resort areas. Provision of inspection and sanctioning.	5. Preparation for the information society by using the education system, mass communication and tourism.	5. Boosting small and medium size enterprises. Realisation of stable economic regulation, incentivising loan conditions, and realistic tax burdens.	5. Modernising the institutional system of tourism. Creation of sources and personnel conditions necessary for the fulfilment of the tasks.
6. Dissemination of environment and nature friendly operation methods and behavioural norms.	6. Enhancing regional equalization by improving the tourism of the countryside.	6. Creation of sources for cultural and environment protection purposes and for rural development.	6. Promotion of the idea of European integration and the appreciation of our national culture simultaneously.

Objective: Joint tasks of regional development and tourism

- The regional and development plans and programmes should pay distinct attention to the reclamation of damaged environment, landscape and nature, and to the conservation, if necessary, improvement, of good water quality and ecological state of Lake Balaton, the other lakes and rivers by the formulation of and in compliance with national and European Union water quality limit values.
- In the existing touristic facilities not in conformity with the requirements the shortcomings of infrastructure must be supplemented within the shortest possible time (e.g. modern wastewater treatment, waste management, protection against noise, etc.). New developments can only be realised after the basic infrastructure for the protection of environment has been put in place.

- Areas suitable for regional planning – having touristic attraction, not under protection, and not suitable for more efficient other types of utilisation – should be primarily developed for touristic purposes.
- Biodiversity conservation should be taken to due account in the environmental impact assessments of the development plans of resort areas.
- In the management plans of national parks and other protected natural areas, ecotourism should receive higher emphasis, and in line with that, cooperation between the National Park Directorates, and the municipalities, local population, nature conservation non-governmental organisations should be strengthened.
- Establishment of a close cooperation with the population living in the given area, the municipalities, enterprises and other organisations in the field of regional development, tourism, conservation of biodiversity and farming.

ACTION PLAN

Short-term tasks

Regional development

- Integration of biodiversity conservation into the regional and development plans and programmes.
- Elaboration of an information system serving the conservation of biodiversity.
- The concept of the hierarchic system of nature/landscape protection plans under preparation needs to contain the conservation of biodiversity.
- Promoting the operation of the associations of municipalities in the field of regional development.

Tourism

- Preparation of information for the touristic enterprises, vocational training institutes and the public on biodiversity, environment, nature and landscape protection, their requirements and the desirable attitude.
- Issuing a publication on the rights and obligations of tourists on the protected and non-protected natural areas.
- Establishing a regular statistical measurement of the ecological pressure generated by tourism (e.g.: frequency of visits to national parks) and initiating research on the methods of how to define load bearing capacity.
- Development of a strategy for the improvement of ecotourism.
- Announcing calls for application for ecotouristic product development.
- Organisation of training courses for the managers of touristic enterprises, touristic experts, tour guides on the nature protective, environmentally friendly ways of operation and behaviour.
- Preparation of education brochures of unified appearance on the ecotouristic opportunities of National Park Directorates and other protected natural areas.

Medium and long term tasks

Regional development

- Preparation of plan and development programmes for the rehabilitation of damaged environment on resort and excursion sites most frequently visited by tourists.

- Preparation of plan and development programme for the restoration/maintenance of good water quality and the ecological state of Lake Balaton, the other lakes and rivers in compliance with the hygiene standards of the European Union.
- In the long term, the main components of sustainable development of the regions based on their specific features must be realised (development of the spatial structure, afforestation, landscape reclamation, formulation of settlement renewal processes).
- With regard to the development of beach harbours, introduction of lake bottom protection, limitations on utilisation, and the elaboration of their effective control.
- In case of further development, prevention of settlements growing together.
- Strengthening cooperation between the Ministries and the municipalities and non-governmental organisations.

Tourism

- Taking into account the general principles of the biodiversity strategy the development of national and regional touristic development concepts and development programmes and their integration into the regional development concepts and the regional plans.
- Announcing a call for application for supplementing infrastructural deficiencies of touristic centres and visitors' centres threatening biodiversity.
- Continuous improvement of visitors and education centres, visitors/reception sites, demonstration sites and study paths.

INSTITUTIONS CONCERNED WITH THE IMPLEMENTATION OF THE TASKS IDENTIFIED IN THE ACTION PLAN

Ministry of Economy and Transport and its institutions, Ministry of Environment and Water and its institutions, Ministry of Education and its institutions, Ministry of National Cultural Heritage and its institutions, Ministry of Interior Affairs and its institutions, Ministry of Finance, National Association of Local Municipalities, Hungarian Academy of Sciences and its institutions, Budapest University of Economics and State Administration, Budapest University of Technology and Economics, media, non-governmental organisations.

VII. LAND USE

INTRODUCTION

Biodiversity can only be preserved through its own self-sustaining systems and processes. Living organisms and habitats fulfil their ecological and landscape ecological roles through complex physical, chemical, biochemical and ecological interactions, as part of the given natural area units, under a spatial and temporal distribution that can be characterised by specific dynamics. The land uses of different purpose and character have an important impact on these self-sustaining systems and processes. Therefore, the changes in land use are of key importance in the maintenance of all (genetic, species, habitats, landscape) levels of biodiversity.

Interrelations of biodiversity and land use

In European or global comparison, Hungary's land use structure differs significantly from that of the most countries. The explanation is the large extension of good, fertile areas and the measures aiming at the further improvement of agricultural production (e.g.: river regulation, flood prevention). Especially the outstandingly high proportion of arable lands and the low proportion of grasslands can be highlighted.

The drastic decrease of the rate and diversity of natural habitats happened in practice by the beginning of the previous century. Statistic figures accurately show that:

- arable lands in the last one hundred years have extended to cover at least half of Hungary's territory;
- measures have been taken to counterbalance the decrease of areas of natural forests;
- continuous decrease of grasslands can be seen;
- in case of areas taken out of production growth is continuous;
- from among the different types of uses, registration as residential area and land use for industry/mining or transport purpose have come to forefront.

With respect to changes, not only the change of the cultivation branch should be examined, as, from an environmental aspect, the type of the technology applied in the given agricultural cultivation branch is also an influencing factor. The microstructure of the agricultural areas also has high importance (changes of the operational field sizes, field protecting forest lanes, borderlands).

The ecological obstacle between the natural or semi-natural areas forced back as islands into the „matrix” of different land uses (e.g.: agriculture) is further increased by the settlements and the different line infrastructure facilities (roads, railways). With respect to the latter, the largest increase has come about in case of motorways having the largest area demand because of their dimensioning/arrangement, and in case of the entry and exit roads. The increase in total can be explained not so much with the total length of the road network, but rather by the area demand of its construction, which also means that in case of most of the roads the barrier character has increased.

The landscape and spatial structural relations of habitats have changed, their natural coherence has decreased. The unfavourable impacts of all these have evolved both with respect to quality and operation.

Unfavourable ecological processes

- Due to the decrease of the area of natural habitats and habitats complexes of appropriate extension earlier, the population of species living there is also decreasing, certain species (especially the ones with low tolerance, rare species) may be forced back or may become extinct. The composition of associations, biocenoses changes, and the dynamic stability mostly decreases. The ecological status, reproduction capacity of species and their populations may deteriorate.
- Due to its small extension, the core area of the habitats shrinks and its vulnerability increases.
- When habitats complexes get damaged, the life conditions of species connected in their life functions (e.g.: food, reproduction, hiding place) to different habitats partially stop to exist and that may easily lead to their extinction.
- In case no similar habitats can be found at an accessible distance for the given species, the chance of migration, settlement and maintenance of genetic variability may critically decrease.
- In case of special habitat complexes (such as the flow direction continuity and the cross direction zonation of habitats by the rivers), if one component of the habitat complex is terminated, the chances of flexible adaptation to the environmental characteristics (aridification, becoming wet) may also deteriorate, and the probability of fast settlement of the adequate species is lower.
- The increased border areas of fragmented habitats are flooded by invasive species, weeds. Along the border areas, the contamination (e.g.: leaching of pesticides, fertilizers) and disturbance from the areas surrounding the fragment are increased. (On some border areas, however, specific new habitats of high biodiversity may evolve.)

Landscape-ecological and scenic impacts

- Because of their shrinking and fragmentation, the positive role played by natural habitats and life associations in controlling the environmental processes can only be effective to a decreased rate (effect on material and energy turnover, heat and water supply). The production purpose cultures of cultivated areas can only partially fulfil this function, while the built-up areas cannot fulfil this in any way.
- The rehabilitation of life associations having become adapted to the local conditions in decades, often centuries and the generation of dynamically stable populations of high diversity again cannot be, or hardly can be achieved (e.g.: gallery forests in the Great Plain). Due to inappropriate land use, site characteristics often get deteriorated (e.g.: erosion, deflation, soil acidification), and that decreases the chances of rehabilitation.
- The unique character of the landscape (determined by characteristic associations, their habits, pattern, scale, diversity in their constancy) is replaced by homogenous production, industrial and residential areas.

The decrease of biodiversity that may be partly explained by the reasons mentioned above, is well shown by the decline and threatened state of certain domestic species and associations. From the aspect of land use all this means that distinct attention should be paid to the protection of the coherence of the habitats and to improving the conservation and rehabilitation conditions of the highly threatened habitats.

STRATEGY

The nature conservation areas represent almost a one-tenth of the country's territory, the maintenance of biodiversity, however, must be extended to the entire territory of the

country. Therefore, the protection, stabilisation and rehabilitation of biodiversity should be a part not only of the National Nature Conservation Masterplan, but should be integrated into the regional planning system (regional development, regional planning, urban and rural development, urban and rural planning) covering the entire territory of the country.

The considerations of biodiversity conservation must be taken into account in all decision-making levels, from the settlement to the national level, because this is the only way it can be incorporated into the programme of the citizens, non-governmental organisations, enterprises and their chambers, municipalities and their associations. This is the reason why the aspects of biodiversity conservation should be directly integrated into the system of regional and urban and rural plans. The double incorporation will increase the chances of enforcing biodiversity.

Obtaining more profound knowledge on the relationships between the wild species, their populations, habitats and associations, the exploration of the relations between habitats is a significant task.

Regional planning and decisions have a significant role in the integrated system of nature, society and economy and in the changes of regional processes. At decision-making, appropriate attention should be paid to the coherence of habitats, and in regional planning and in the exploitation of natural resources legal, economic and other tools must be formulated and enforced that take into account the preservation of coherence.

We should make efforts to generate in Hungary a landscape structure, landscape use, ecological-economic unity and scenery where

- Towns and cities are embedded into green space systems,
- Settlements are attached to areas not intended to be built up (outskirts) by a border area,
- The line facilities of infrastructure are fitted into the landscape,
- The rate of extension of the settlement slows down, or comes to a halt locally,
- Outskirts will not be built up,
- The proportion of protected natural areas continues to increase (from the current 9.4% to above 10%),
- Wetlands become rehabilitated,
- Agricultural areas of several hundreds – sometimes several thousands - hectares without any trees will no longer be characteristic,
- The size of arable lands, fields decreases to 30-100 ha varying according to plain and mountainous areas, and become fragmented by shelter forest belts, borderlands, rows of trees,
- Integrated and organic farming (traditional methods, small amount of chemicals) becomes wide spread on a larger scale,
- River banks/lake shores will not be enclosed and banks/shores become accessible,
- The increase of alien tree species (green ash, tree of heaven, black locust, false indigo, boxelder) and herbaceous plants (giant golden rod, common milkweed) are successfully suppressed.

Objective: Harmonisation of interests

Harmonisation of interests must be ensured in the regional and urban and rural plans. Biodiversity must be enforced in land use, landscape uses, expectations against transport and water regulation, etc. It is advisable to support this from three sides, that is, by

- rural development programmes,
- landscape protection plans, and

- other „diversity” programmes (maintaining cultural diversity, protection of minorities, etc.).

Rural development, landscape protection and culture involved in harmonisation share one common feature: for all three, an essential prerequisite to reaching stability is biodiversity, the colourfulness of its components and abundance.

Development potentials are not unlimited, tools cannot be infinitely mobilized in the interest of regulation. Characteristics and potentials must be managed within a finite frame, also allowing for self-regulation. The maintenance of biodiversity is primarily a management issue, and it is a planning issue only within the frames of management. A prerequisite to maintaining biodiversity is the establishment of a new management system followed by the renewal of the planning system on this basis.

Objective: Generating motivation

As being a common good, the maintenance of biodiversity is a public service task. It is a public service task, however, that cannot be fulfilled in any way without the active participation of the stakeholders (individuals, organisations) concerned with and having an interest in the use of the given area. Active participation can only be effective indeed if its motivations are not forced from the outside but are integrally incorporated into the system of its driving engine.

A long term and effective strategy must aim at the values of those concerned with the utilisation of the landscape or area, because, on the one hand, the integral transformation of the value systems can only be hoped for in the long term, on the other, this is what offers a lasting solution also in the long term.

Due to its nature of offering public benefits, it is especially important to point out biodiversity's external effects, to make them sensible, and convert them into internal factors. In addition to the targeted transformation of the regulatory system which provides the external framework, it also presupposes the integration of the relevant knowledge on environmentally oriented approach and biodiversity (that is, not all details of the disciplines, but the knowledge related to the given activity and land use method) into the way of thinking of those taking part in decision-making.

In the coordination of activities aiming at maintaining biodiversity, a scope should be left for the decentralisation efforts and the principle of subsidiarity.

ACTION PLAN

Biodiversity has different meanings in urban, rural, agricultural, forestry, horticultural, resort, water management, nature conservation, etc. land uses. Yet in spite of the significant differences between the different land uses, a strong borderline cannot be always drawn.

Below the action plans on the utilisation of areas are described that have not been detailed in the major chapters.

Transport

One of the largest impact on the changing of a certain area – directly and indirectly – is infrastructure development.

- Transport transit corridors must be established and maintained fitted into the trans-European transport network and causing the least possible environmental pressure and environment utilisation.
- The state should promote, by using direct tools, shipment by more environmental friendly railways and inland waterways with smaller land use and energy consumption demand.
- The state should promote, by using direct tools, the combined shipment methods merging the advantages of the different transport methods, promoting their cooperation, mitigating the environmental harms and gaining an increasing space in the developed European countries (by providing funds primarily for development, and only in exceptional cases and temporarily for operation).

Land use of settlements

- Plans must be prepared for the realisation of a coherent green belt system for the settlements (villages, towns, cities), which, beyond enhancing biodiversity, also serve holidaymaking and tourism (construction of bicycle roads, promenades, pedestrian connections). To implement the green belt system plans of settlements – of towns and cities in the first place – the areas necessary must be purchased, or a right of pre-emption obtained.
- The decrease of green spaces at settlements should be stopped. In case it cannot be avoided, new ones must be established.
- Plans must be prepared for the regulation of the residential boundary areas (outskirts of the town, city or village), and the proposals on the urban and rural plans concerning outskirts or other fragment areas around settlements must be implemented. On the residential boundaries, shrubberies, hedges, solitaire trees, groups of trees, rows of trees, forest spots, forest belts should be planted (to hide unfavourable scenery, to ensure the nesting and hiding places, protection against wind erosion, etc.). Around cities, a green belt must be established.
- By planting trees on the streets of the settlements, setting up public parks, using garden design to arrange their open spaces, efforts should be made to generate a picture of harmonic streets and settlement structure and to increase biodiversity.
- Dynamic building up of the areas outside the residential boundary (belts along motorways, resort zones, health resorts) and the expansion of the settlement should be prevented. The merger of the non-built up outskirts and the built-up residential areas and the acceleration of the process bringing about a mosaic structure should be prevented, or decreased.

Land use for resort purposes

- In order to preserve protected natural assets, demonstration sites should be set up for visitors in the national parks, landscape protection areas. The construction of the demonstration sites, the arrangement of the access roads and exploration roads, and the formulation of the infrastructure networks should be implemented in line with the priority of nature conservation aspects.
- Water surfaces, water reservoirs, lake shores play a significant role in land use for resort purposes. In the vicinity of shores/banks arranged for bathing purposes the reedbed zone becomes damaged, lawns are intensively trampled on, and the abundance of species decreases. At bathing sites, reeds and other aquatic plant populations become ultimately destroyed. Motorboats directly pollute water (oil, waste, waste water), and waving erodes the

shores. Boaters, anglers and swimmers disturb avifauna, and for this reason birds often leave their nests. Threatened water banks/shores must be explored, proposals must be elaborated for their protection, and conflicts must be resolved.

INSTITUTIONS CONCERNED WITH THE IMPLEMENTATION OF THE TASKS IDENTIFIED IN THE ACTION PLAN

Ministry of Agriculture and Rural Development and its institutions, Ministry of Environment and Water and its institutions, Ministry of Economy and Transport and its institutions, Ministry of Interior Affairs and its institutions, Ministry of Finance, National Association of Local Municipalities, Ministry of Education and its institutions, Ministry of National Cultural Heritage and its institutions, Hungarian Academy of Sciences and its institutions, Budapest University of Economics and State Administration, Budapest University of Technology and Economics, media, non-governmental organisations.

VIII. HUNTING

INTRODUCTION

Hunting as a form of utilising the biological resources is having importance in the implementation of the Convention on Biological diversity. The provisions of the Convention on the identification and monitoring of the adverse processes, on the regulation and management necessary for sustainable use, and the conservation or restoration of habitats, or the adoption of measures to minimize adverse impacts on biodiversity are also applicable to this activity. Furthermore, hunting may also have an important role in controlling and pressing back invasive species.

Under the modern concept, game management means the whole system of activities aiming at the management and influencing of wild game species and their habitats. The prime reason for species becoming threatened is generally the destruction, deterioration, fragmentation and pollution of their habitats, but the rate of use also often exceeds the self-sustaining capacity of the individual species. Hunting may become a threatening factor especially in case of species/populations that have become scarce for other reasons.

Decisive components of the strategy

In accordance with the number and dynamics of game stocks, wild game management may follow three major directions:

- In case of decreasing stocks or stocks of small number, the purpose of intervention is protection.
- In case of stable stocks, or stocks with a regular growth capacity, the objective of intervention is utilisation enabling us to ensure sustainable and wise utilisation.
- In case of fast growing stocks and/or stocks of large number, provided that this may lead to damages by these species in their environment, the objective of intervention is regulation.

Therefore, game management represents continuity between protection, utilisation and regulation, and means in essence the dynamic application of identical ecological, scientific and management tools determined by the given situation. In all three cases, game management is a combination of interventions into the stocks of game species, which in the long term, cannot be successful without knowing the correlations between the population and its habitat. Beyond the size of the stock of the given species, the rate of global threat the species is exposed to should also be considered when making decisions.

Measures that only prohibit hunting and handle the species concerned as separate from their ecological and social-economic environment often yield no results because of the significance of impacts detrimental to habitats. Appropriate regulation and the maintenance and development of rules must pay special attention to the interests of the local communities and landowners. From the point of view of biodiversity conservation, most of the time game stock use becomes an inhibiting factor of stock maintenance when it is unregulated or uncontrolled, or game utilisation offers a significant market profit. A characteristic of uncontrolled - especially illegal – markets is that the financial profit of game stock is realised not at the place of utilisation, but on the different levels of intermediary trade. Similar problem may be the reduction of certain predator stocks to an unjustified low level and the reduction of the stock of protected predators close to extinction.

On the basis of the above, the following should be considered and elaborated within the framework of the strategy:

- Elaboration and implementation of management plans considering the dynamics of habitats and stocks.
- Processing and application in a consistent manner of the monitoring, habitats and stock management methods and experiences accumulated in the international and national game management research and practice, with special attention to their nature conservation aspects.
- Changing the way of thinking of experts specialised in game management and hunting who will use in practice the principles identified above in line with nature conservation and based on this will build cooperation between the special areas. To implement these, on the side of game management experts are available mainly in sufficient number. The concept of training available in Hungary on game management reflects modern tendencies and the higher education schools represent science at the same time.

The background of game management and hunting and their place in society and economy

The issues of game management and hunting are regulated in Act LV of 1996 on game protection, game management and hunting. Certain issues related to the implementation of the act on hunting are contained in Decree No. 79/2004 (V. 4.) of the Minister of Agriculture and Rural Development.

Hunting right as a right with property value is inseparable from the property of land. It is mandatory for the person with hunting right to exercise or use the hunting right due to him as provided in the legislation. The prerequisite to exercising hunting right is to have a coherent area of at least 3,000 ha suitable for hunting that may be acquired by the land owners individually or in the form of an association.

In late 1999, 1,161 hunting areas were registered in Hungary either having a function of game management (1,113) or special purpose. A hunting area may be registered as one having special purpose in case

- a) the preservation of the gene stock of the game makes it necessary (18 hunting areas);
- b) it is necessary for education-research purposes (13 areas); and
- c) it is necessitated by the enforcement of nature conservation interests (17 areas).

In Hungary, anyone to become a hunter must have:

- a) a hunting licence or a hunting permit;
- b) a hunting gun licence issued by the competent police authority;
- c) a permit for keeping a bird of prey issued by the nature conservation authority in case of a hunter using a bird of prey for hunting;
- d) a permit for keeping a hunting bow issued by the competent police authority in case of a hunter using a bow in hunting.

In the interest of the protection of game and their habitats, the act on hunting establishes hunting seasons, and game can be killed or caught exclusively in the manner and by the tools identified in the law. It is prohibited to catch or kill game by applying non-live trapping methods (applying, in particular, iron trap, snare, hook), or a pit or poison.

The act on hunting and its implementation decree fulfils all the requirements contained in international conventions that Hungary has joined (Bern Convention on the Conservation of European Wildlife and Natural Habitats; Bonn Convention on the Conservation of Migratory Species of Wild Animals; African-Eurasian Migratory Water Bird Agreement; Ramsar Convention on Wetlands of International Importance Especially as Waterfowl Habitat; the Washington Convention on International Trade in Endangered Species of Wild Fauna and Flora).

In the recent decades, the number of hunters has in fact continually increased. Subsequent to the change of the regime, and as a result of the liberalisation of hunting, the number of hunting licences issued annually was around 45,000-50,000.

A significant part of the current 10 billion HUF revenue of the Hungarian game management comes from hunting by foreign guests. By now the number of foreign hunters has become stable, it is around 20,000 per year. Guests come in the first place from the Member States of the European Union. From the aspect of the operation of the sector and its future development, the maintenance of good market reputation is of fundamental importance.

Parallel with its revenues, the costs of game management have also abruptly increased in the recent decades. This process is still going on, and the maintenance of the conditions of game management requires a significant capital investment in future.

STRATEGY

Objective: Maintaining an appropriate game stock

At present 6 big games (Red Deer, Fallow Deer, Roe Deer, Mouflon, Wild Boar and Sika Deer) and 26 small games (Brown Hare, Rabbit, Muskrat, Polecat, Beech-marten, Badger, Fox, Golden Jackal, Raccoon Dog, Raccoon, Pheasant, Partridge, Bean Goose, White-fronted Goose, Mallard, Garganey, Teal, Pochard, Goldeneye, Coot, Woodcock, Collared Dove, Wood Pigeon, Hooded Crow, Magpie, Jay) can be hunted for. Considering the size of their stock and hunting value, only the five big games and Brown Hare, Pheasant and Mallard have higher economic importance.

The proportions of quantities of game stock and their regional distribution have significantly changed in the recent decades. The changes in the number of stock of big and small game and their regional distribution, however, are due primarily not to conscious game management interventions, but to processes generated by changes that have occurred in the habitats. The traditional distinction between big and small game has lost its significance on most of the territory of the country, therefore traditional game management principles and approaches are often difficult to use. Adaptive and experimental game management may be the best tools to adapt ourselves to changes expected in future, but to enable ourselves to do that a radical change in our way of thinking and a consistent application of the scientific methods are needed.

Concerning the changes in habitats, however, one may say in general that the treatments favourable for game, increasing habitats diversity and improving their natural aspects are of key importance in the conservation and increase of biodiversity. More diverse habitats are able to maintain more diverse animal associations, and nature-like interventions that are favourable to game species are well compatible with the nature conservation objectives. The protection and utilisation roles of game management are connected by the treatment of habitats that provides the basis for cooperation with nature conservation and that may yield the largest benefits in the conservation of biodiversity.

Adaptation to the changes in habitats expected to continue also in future makes it necessary for the agriculture (including hunting) and nature conservation authorities to find common aspects in the protection, management and maintenance of habitats. By means of cooperation, the efficiency of sources currently managed separately could be significantly improved (e.g.: management and restoration of wetland habitats).

- In game management, the cornerstones of protection are tough compliance with the closed seasons and certain limitations and reducing the detrimental impacts of human presence to a minimum.

- In case of some game species, the increase of the stock imposes a serious pressure on our environment, while other species are unable to sufficiently fulfil their ecological role due to the decrease of their stock. Therefore in case of certain species, the reduction of stock is needed while in case of some other species interventions aiming at active protection are necessary.
- A major task is to prevent mouflons' occurrence in naturally sensitive habitats (associations of extreme sites in medium-high mountain range), and to press them back from these areas.
- The monitoring and control of the stocks of alien species often causing unfavourable changes in the native stocks is a significant task.
- Nature conservation concept opposes the introduction of game bred and kept in enclosure into free environment if it is merely done for economic interests in order to enrich the stocks living there. On protected natural areas it is almost always prohibited. Breeding and keeping in enclosure though may have a role in maintaining certain gene stocks, therefore, it is justified to maintain such opportunities in future. It must be prevented by any means that the release of bred game imposes a genetic threat on natural stocks.

Objective: Game management planning and implementation of sustainable game management

Demand for planning in game management in Hungary emerged in the early 20th century. Game management planning primarily meant the determination of the number of game that can be killed, but even before the second World War, the establishment of the so-called hunting districts was proposed intended to manage the contradictions between the management, damages and use of the small territory of the hunting districts and the large area for the movement of the big game. The partial introduction of the game management planning system was started in 1971, then, as of 1981, a statutory operation planning for a term of ten years was introduced.

Act 55 of 1996 on game protection, game management and hunting provided for the introduction of a three level planning system. In the planning system, the district plan aims to determine the ecologically based management frames and to implement the concept called landscape management in game management literature. On the basis of the above, the ten-year long game management plan provides a frame for the long-term activities of the individual game managers with consideration to the local general conditions and the expected tendencies of management. On the basis of the district plan it also enlists the methods recommended in game management in the interest of implementing wise management of the game stock. The annual game management plan is meant to ensure the activities adjusted to the current situation and the professional control of game management. As part of the system, adaptive management can be implemented through the annual game management plan, which, in an optimum case, also contains a continuous learning process.

On the basis of the similarities of the game stock and the environment, 24 game management districts have been designated in Hungary.

Pursuant to the law, a National Game Management Data Base has been set up which can create the conditions of fast adaptation to current state and continuous changes. The improvement of the following components is necessary for the efficient operation of the system:

- Improvement of expertise indispensable to the operation of the system by the development and application of assessment methods, planning models and management

methods. Financing the related necessary researches, preparation and publication of methodology/planning documents. .

- The implementation and comprehensive application of authentic monitoring programmes is extremely important which can also mean a coordinated use of new methods, bio-indicators and rapid monitoring methods.
- Appropriate measures, primarily more stringent legislation, should be taken to suppress poaching.
- A cornerstone of game management activity should be the documentation of the spatial changes of the game stock.
- In addition to the determination of the spatial pattern, knowledge on the daily and seasonal rhythm, movement and dynamics of the game should be available in order to enable us to protect the ecological corridors used by them when exploring and designating the National Ecological Network. Since the life-form of a number of protected species raises management problems similar to the ones in case of game species, it is advisable to organise these activities by the involvement of the nature conservation interests.

ACTION PLAN

The strategy must be aimed at determining what knowledge is necessary for the establishment of a balance between conservation and use, and at the elaboration and introduction of methods which can be used in practice. For that purpose, the two fundamental thoughts behind action are the following:

- The areas that are currently separated on the basis of emotions and/or traditions must be placed in a consistent frame.
- Consciousness must be raised concerning the fact that the management of game stock will be dynamically adjusted to the current state of the habitats and the stock. Use and protection are not static activities, rather they depend on the state of the habitats and the stock. With attention to all this, way must be found to allow the regulating provisions on both protection and use to follow more flexibly than before the changes occurring every now and then.

The conservation of biodiversity is aimed at the preservation of natural resources and the provision of the conditions of their sustainable use. In order to attain this, there must be a capacity, with regard to game species to give a reliable assessment of game species stocks and their dynamics; to determine levels of use not posing a threat to the stocks; to prevent their overexploitation and to maintain the appropriate ecological processes on the habitats of the resource under use and on the surrounding areas.

Therefore, efforts should be made to elaborate management systems able to both monitor, and get adapted to the changes of use and resource. Such a system is able to co-exist with the uncertainties of the species under use and their environment (stochasticity), and by continuously learning from the results of management it is able to improve itself while at the same time it also creates reliable knowledge indispensable for sustainability.

Research and practical work must be focused on the following areas

- Development of technical methods for the characterisation and mapping of habitats.
- Application of habitats mapping and geographical information based simulations to model and forecast the space-time dynamics of wild fauna, the movement of certain big game stocks in particular.

- Monitoring huntable species in order to create the foundations for the conservation and management tasks. Annual quantities of species open for use must be determined on the basis of the monitoring results.
- Efforts should be made to establish game stock levels appropriate to the natural game carrying capacity with special attention to the other animal and plant species.
- In case of game species with a decreasing stock, above all, Brown Hare, Partridge and waterfowl, species protection plans must be elaborated and implemented.
- With respect to waterfowl, the number of waterfowl protection areas must be increased, and the prohibition to use lead shot must be introduced on all wetland habitats until 15 August 2005 the latest.
- Monitoring predators and elaboration of management strategies appropriate for their situation and dynamics. An especially important task is the elaboration and implementation of a fox management strategy in order to reduce the number of individuals of this species to a level tolerable for their environment.
- Where the hunting right on a hunting area belongs to the nature conservation organisation, game management is part of the nature conservation management. It has a proven practice, which is pursued in accordance with the rules issued by the competent deputy secretary of state. It is necessary however to develop game management guidelines also for the hunting areas having, for nature conservation reasons, special game management purpose where the nature conservation organisation the hunting right.
- In year 2003, the Game Management Concept of Nature Conservation was prepared. The fundamental objective of elaborating the concept was to promote the interests relating to the protection of nature and game; to create a professional foundation for the creation and amendment of the relevant legislation in future; to develop a nature conservation position concerning the excessively large game stock of Hungary; to provide consistent guideline on the nature conservation purpose management of hunting areas where national park directorates have the title of hunting; to enhance the improvement of the state institutional system of nature conservation from the aspect of the field of hunting.
- The big game criteria of culling system must be reviewed as it influences, or may influence, the gene stock of these species. Efforts should be made to maintain natural genetic diversity.

INSTITUTIONS CONCERNED WITH THE IMPLEMENTATION OF THE TASKS IDENTIFIED IN THE ACTION PLAN

Ministry of Agriculture and Rural Development and its institutions, Ministry of Environment and Water and its institutions, Ministry of Education and its institutions, Ministry of Finance, Szent István University (Gödöllő), University of West Hungary, media, non-governmental organisations.

IX. WATER MANAGEMENT

INTRODUCTION

Without water there would be no life. Water is a specific medium of biosphere, ensuring as a solvent the appearance of ions that are indispensable to life and living beings. This vulnerable resource of ours which is available in a limited quantity in space and in time has become one of the most decisive factors of development in the 21st century.

The global scale problems relating to water have emerged as a result of the increase of the population on Earth, the increased water consumption due to urban life style and intensive agriculture, the changes caused by global warming, the specific water shortages occurring on certain areas, and the international nature and increasing pollution of the large catchment areas.

Water management is a human activity affecting the whole of social-economic development, therefore its state-of-art principles and practice can only be determined by considering the interrelations of all the components and processes of the environment. This activity at the same time requires coordination with the regional and national level regional development efforts and activities, and with the water management of other countries belonging to the given water system (catchment area).

In its water management aspects, the Strategy must have as its starting point the main objectives of water management on the one hand, and the fundamental requirements of maintaining biodiversity on the other hand.

Hungary's water management characteristics

Hungary is situated at the absolute bottom of a basin surrounded by one of the most closed mountain chains in the world where large biogeographic area units meet. 84% of Hungary's territory does not reach the 200 m above sea level. On the other hand, large areas with no drain off or areas exposed to flooding can be found on the Great Plain. All of our standing waters are rather shallow (some of them being extremely shallow) and due to this, instable, but at the same time, Lake Balaton, the largest lake in Central Europe can be found in Hungary. Our rivers arrive from three geographical directions (from the East, the North and the West), in a fan-like pattern, and leave our country in a fourth direction, to the South.

The timely and spatial distribution of precipitation is uneven. The annual average is 600 mm. Hungary's flow regime is rather extreme: floods, droughts and inland waters cause problems. Hungary has the largest area in Europe, at least 21,300 square kilometres, threatened by floods. However, on plain area – that is about 43,000 ha – inland waters cause the problem, which is an interesting characteristic of our country.

Due to the water regulations commenced in the 17th century the water map of Hungary has changed significantly, the proportion of wetland and flooded areas has significantly decreased.

Since after the Peace Treaty of Trianon and later that of Paris the catchment area borders – previously identical with the national borders – got outside the country, today 95% of our surface water supply arrives from foreign countries in a biological status that we can hardly influence. For that reason, international cooperation is of outstanding importance. The bulk of the water enters our country through 24 rivers and leaves the territory of our country through 3 large rivers, River Danube, River Tisza and River Drava. Within the borders of Hungary only four medium size water catchments can be found.

Our specific surface water supply per person is one of the highest in Europe, about 11,000 m³/year/person. The contribution of drain-off to this figure in our country is far the lowest on the continent.

Our standing waters, reservoirs and underground waters providing 90% of our drinking water supply are significant. Within the latter one our sensitive, bank filtered water bases are of outstanding importance, providing 45 % of our drinking water. Our large rivers have acceptable water quality thanks to large-scale dilution.

Our country is characterised by aquifers polluted in the upper layer in the proximity of settlements, vulnerable bank-filtered water bases and protected deep groundwaters. The quality of our surface waters with low dilution capacity is poor. Our shallow lakes show signs of nutrient enrichment of different levels. Drinking water supply in Hungary is based mainly on our underground resources.

Expectations of the European Union

Directive 2000/60/EC (Water Framework Directive of the European Communities, hereinafter: Water Framework Directive) that entered into effect on 22 December 2000 is the most important tool in the enforcement of the European Communities' new water policy. The European Communities' new water policy and Water Framework Directive is a milestone in the improved protection of waters and in the implementation of integrated water management.

The Water Framework Directive provides that a good ecological status of all surface and ground waters should be achieved and they should be sustained in this status in the Member States of the European Union until 2015 in case of waters where it is possible at all and the achieved good status should be made sustainable.

The significance of the Water Framework Directive lies primarily in giving a unified frame of regulation for the quantitative and qualitative protection of surface and ground waters, for actions against point and diffuse sources, and in providing for the coordination of river basin level measures in order to achieve a good status of the waters. Naturally, the implementation of the Water Framework Directive is not a completely new programme in Hungary as a number of national programmes initiated by water management, environmental and nature conservation and containing water protection components were launched or implemented during the last decade. Hungary has also taken part in a number of international programmes aimed at achieving a good status of waters that are closely interrelated with the Water Framework Directive. The most significant objectives identified as parts of the National Environmental Programme are the following: Further Development of the Vásárhelyi Plan, National wastewater collection and treatment programme, Programme for the improvement of drinking water quality, Water base protection programme, Backwater programme, Kis-Balaton programme, Tisza Lake programme, Danube-Tisza Hátság programme, Szigetköz water replenishment programme, Ráckeve-Soroksár Danube branch programme, River basin management planning programme, Nitrate programme, Hungarian Biodiversity Monitoring System, Nature conservation monitoring programme of River Dráva, National programme environmental remediation programme, the implementation of the Ramsar Convention on wetlands of international importance especially as waterfowl habitats.

The introduction of the Water Framework Directive emphasizing the ecological requirements and the European Union's nature conservation directives opens up new perspectives for the conservation of biodiversity. The Water Framework Directive places a strong emphasis on the aspects of biodiversity conservation, and on the maintenance and improvement of aquatic ecosystems and terrestrial ecosystems directly dependent on water and wetlands. The designation of water bodies, typology, ecological water quality assessment

and monitoring are of priority importance in the Water Framework Directive. An important aspect of water resources management is to provide the ecological and economic water demand, which at the same time also enables us to realise the protection of wetland habitats and to achieve a good ecological status or potential of waters.

While making efforts to protect biodiversity of aquatic ecosystems it should be emphatically noted that water is a solvent of life media: our natural waters are (in general) thin solutions that are much more varied, variable and vulnerable than the air media of the terrestrial ecological systems. The state of solution of our natural waters may easily change even due to physical impact (e.g. heat, light, pressure, current velocity, etc.) and herewith bringing about a significant change in life conditions and relations. Therefore water management interventions, water uses can alter, both physically and chemically, the diversity of habitats that are the scenes of biodiversity. All this is especially true for standing waters that are present in space confined within their limits, retaining the potential long term consequences of an up-to-date alien (external) impact.

Due to the fact that Hungary is situated in a basin, the rivers coming down from the surrounding mountains represent significant flood threat. Both on plain and mountainous areas, modern water resources management can utilise this water quantity coming occasionally all of a sudden and presenting a large threat by retaining water on the area and by using the existing reservoirs to provide water replenishment to areas with scarcity of water. Subsequent to the coordination of the needs of water management and biodiversity conservation, integrated river management planning must be realised on the basis of broad scale consensus, in the frame of open planning procedure. One of its priority areas is the Tisza Valley, where in the course of the Further Development of the Vásárhelyi Plan, flood safety is increased by the partial rehabilitation of the exempted flood plains with attention to the nature conservation aspects, and, at the same time it also serves the sustainable regional development of the area.

STRATEGY

The principle of our national strategy: maintenance and restoration of biodiversity in the entire surface water network, providing efficient protection for protected natural areas, areas with full scale protection falling under the scope of international conventions (the Ramsar Convention in particular) (hereinafter in summation: the protected areas) and taking into account the water use related interests of non-protected areas.

In our efforts aimed at the maintenance of biodiversity, the impact coming from the direction of terrestrial ecosystems and river basin related to standing waters and watercourses cannot be disregarded with respect to water management. Their influence on the status and quality of water is obvious. A characteristic of Hungary's surface water system is the above-mentioned fact, namely that 95% of this water comes from outside our national borders. For that reason, in our national objectives we cannot avoid considering the impacts outside our national borders either. In the same way, the transboundary surface waters, watercourses leaving the territory of our country may have a decisive impact on biodiversity on the territories of the neighbouring countries.

The way of water may have outstanding importance for the migration and gene exchange processes.

The originally coherent floodplain sections accompanying the flowing water with varied width must be kept coherent as far as possible, and if fragmentation occurs new connections must be established to keep them together. In case of standing waters, depending on their morphological characteristics, connection may be broken by any intervention of

water construction that, for example, divides the naturally coherent lakebed or modifies the internal flow system of the lake. A delicate component of biodiversity maintenance in case of lakes too is the issue of preservation of the shore zone in the most natural status, and in relation with that, fulfilling efforts to stabilize the shore belt.

The provision of ecological corridors for surface waters is an important and delicate task. The conditions to make these corridors efficient are different in the water body, in the shore zone and in the floodplains that are naturally related to waters. In the water body continuity can be terminated not only by some sort of damming but also by altering the flow conditions of a section's water flow or by the permanent local pollution of a section.

With respect to our surface waters, among the major objectives of the strategy on biodiversity conservation special attention should be given to the following:

- Preservation and improvement of the state of the protected areas (the priority status of this objective is justified by the increased importance of the external impacts due to our waters' solution related sensitivity and shallow depth).
- Preservation and improvement of biodiversity outside the nature conservation areas.
- The regional development efforts that have become rather intensive on a national scale are a special reason to provide protection to waters on areas that are not under protection and to maintain there the semi-natural conditions.
- Development of tools necessary for the sustainable use of biodiversity.
- In addition to our developed water quality protection legislation, further development of a more efficient institutional system enforcing the legislation is needed and public information and the development of responsible social consciousness are necessary with special attention to the fact that waters have a natural aesthetic attracting value that often generate a detrimental human use..
- Enforcing the principle of prevention (e.g.: in the development and review of local or regional development plans of a part of a river basin).
- Sustainable use of biodiversity and its components.

Any kind of use of wetland areas outside the scope of nature conservation areas can fundamentally be permitted only by prescribing protection regulations that serve the maintenance of biodiversity. In the interest of the implementation of some social-economic objective, compromise may be feasible or necessary with attention to priorities and with consideration to proper arguments.

ACTION PLAN

In relation with the main objectives concerning our waters the following tasks are the most important:

Preservation and improvement of the state of protected natural areas

- Supplementary base state assessment: on our protected waters and on most of the waters on protected natural areas a full scale ecological and hydro-biological assessment of the waters must be performed providing also an adequate characterisation of the habitats and their associations including the seasonal fluctuations and long term tendencies of change.
- Collection of existing data, their possible evaluation and eventual publishing: large quantities of data are available most of them organised on the basis of some principle and

even published. These data should be grouped and evaluated in accordance with organising principles that serve the maintenance of biodiversity. That would at the same time enable us to defining the deficiencies creating a foundation for measures to correct deficiencies.

- Developing and supplementing monitoring systems: in order to sufficiently monitor the changes of state, the parameters to be measured in all protected waters and the applied monitoring strategy must be established, and, in addition, the parameters to be measured in the specific waters and the applied measurement strategy must be defined.
- Preparation of general guidelines and practical guidance for the maintenance of biodiversity of different water types in Hungary (by the demonstration of an example/model developed for a specific water): as part of this, the most fundamental biological, ecological information, including the guidance specifically developed for the water used as an example must be presented.
- Stocktaking of potential hazards from areas outside the protected natural area: polluted inflows, leaching in, pollution from the atmosphere, external impacts modifying the mezo- and micro climate (e.g. construction, deforestation, noise pollution, etc.).
- The conditions to long term maintenance of protected natural areas should be established with special care: in case of a number of protected water areas, due to lack of proper strategy and financial tools, not only the base status assessment is insufficient but even the conditions valid and crucial to the given water area are not known, and without compliance and their stringent provision the smaller or larger scale damage of the protected water area, moreover, the collapse of the given ecological system (which is the basis of protection) is inevitable. The occurrence of these risk factors can be prevented by the development and implementation of statutory measures, which are in a number of cases a prerequisite to the long-term conservation of our protected natural assets.
- The information for, education and training of all those taking part (in any level) in the implementation of the strategy must be significantly developed: Training of the nature conservation organisation staff on water protection tasks must be organised. We should at last step beyond the concept that often considers protected water areas as only habitats of birds or growing site of protected plants. A number of excellent specialist publications have been issued that can be used to prepare the toolkits of the training programme. The training materials of nature conservation (environmental protection) on surface waters should be further improved conceptually in order to include a more substantial characterisation of habitats diversity in addition to the presentation of the aquatic biosphere on the level of species or associations. In the area of raising social awareness, progress was made in the past one or two decades, which should be significantly broadened. The driving forces and programme offers of developing ecotourism and tourism should also be utilised to provide information on the natural assets and usefulness of waters in addition to their recreation capacities.
- In the spirit of the European Ecological Network concept, the Natura 2000 programme, and other national efforts, the habitats map with a scale of 1: 10,000 should be created within the shortest possible time.
- On protected natural areas that are to be increased until 2010, appropriate share should be given to water areas not yet under protection but worth protecting, even if the necessary financial sources are temporarily not available. Since legal protection serves as the basis in itself of the protection of natural habitats.
- Plans must be prepared for the reconstruction of waters of deteriorated state on protected natural areas, and the conditions of their implementation must be provided.
- Efficient measures should be taken against invasive species. The impact of deliberately introduced or spontaneously occurring species on natural associations, their food web,

and the nutrient cycling of the given water space must be examined. If necessary, proposals should be elaborated on how to limit, or suppress the proliferation of these species.

- Primarily on protected natural areas, the technical solutions must be kept within a rational framework in order to minimize disturbance and on account of the principles of sustainability.

Conservation and improvement of biodiversity outside the nature conservation areas

- Demands should be declared the enforcement of which enables us to conserve the biodiversity of those natural or semi-natural water areas that are outside the protected areas.
- The areas, water types deserving special attention among water areas not under protection should be determined. More attention should be paid to placing under general protection the representatives of the different water types.
- The rehabilitation of the Danube should be handled as a priority programme, with special attention to the Szigetköz area, and the river sections on the territory of the Danube-Ipoly National Park and Danube-Drava National Park.
- Solution must be found, as part of a priority programme, for the conservation of the biodiversity of the two lakes with different character, Lake Balaton and Lake Velencei.
- Special care should be taken to prepare a detailed exploration of the state of our small watercourses that have been in an especially unfavourable situation from the aspect of management and protection, and the guidelines of their use should be elaborated. Preparations should be made to designate certain types of small watercourses still in good condition for protection.

Development of tools necessary for the sustainable use of biodiversity

- Research tasks must be coordinated with the European Union's research and development programmes with special attention to providing opportunities for international cooperation, and the relationship of our domestic research with the international programmes including programmes of non-governmental organisations should be made more active and better organised.
- The priority importance of waters' diversity and the necessity to rehabilitate them should be more clearly articulated, making it easier to understand, for politics, public administration and jurisdiction.
- Provisions should be made for the continuous operation, improvement of the elaborated National Biodiversity Monitoring System and for the evaluation and utilisation of its results.
- Information flow should be ensured between the research, registration sites, the persons responsible for legal regulation and the users.
- Training and education on the importance of aquatic and wetland habitats from the aspect of biodiversity should be further developed on all levels of education.
- A strategic and functional coherence of biodiversity conservation should be developed with all those directly or indirectly neighbouring countries with whom we have contact through our surface waters coming from or entering into these countries.
- The system of Environmentally Sensitive Areas should be operated.

Use of biodiversity and its components

- The criteria of sustainable and wise use of the biological resources of our waters should be elaborated in details with the implementation of which the vitality and biodiversity of the species on the given area do not decrease.
- The principles of compromise should be elaborated that could be used as a starting point to establish the restrictions for any kind of use of water areas outside nature conservation areas.
- Plans should be made for the establishment of an advisory organisation, which gives proper and correct guidance on how to enforce the ecological aspects providing the possible maximum protection for biodiversity, or concerning the implementation of some social-economic objective.
- The enforcement of the principle of sustainable use fundamentally depends on to what extent the society can be made aware of the fact that it is in the interest of the society and it is crucial for the existence of the future generations. This task is one of the most important components of public awareness that has already been identified in relation with strategy.

INSTITUTIONS CONCERNED WITH THE IMPLEMENTATION OF THE TASKS IDENTIFIED IN THE ACTION PLAN

Ministry of Environment and Water and its institutions, Ministry of Education and its institutions, Ministry of Finance, Hungarian Academy of Sciences and its institutions, Eötvös József College - Faculty of Technology, Budapest University of Technology and Economics (Faculty of Architecture), media, non-governmental organisations.

X. MOLECULAR BIOLOGY METHODS AND BIODIVERSITY

The use and application of genetically modified organisms (GMOs) developed by modern methods of biotechnology are still not clarified and may be accompanied by unforeseeable health (including the health of living organisms), social, natural, environmental and economic (See: organic farming) consequences and risks. Therefore, genetically modified organisms can be created and used in practice exclusively under full social control, on the basis of detailed legal regulation and in accordance with the authorisation issued by the competent authorities.

Among the molecular genetic methods some may promote the maintenance of biodiversity while others pose a serious threat. The methods in question are classified into three groups below and their relation to biodiversity is examined separately. This classification is needed for the most part because the applications in the different groups have varied impacts from the aspect of biodiversity conservation. The methods contained in the first group are discussed in detail as this is the most important and most controversial area from the aspect of the elaboration of the strategy for biodiversity protection. The classification is as follows:

- cultivation/breeding of genetically modified organisms,
- other biotechnological applications,
- application of other (non-biotechnological) molecular methods.

Cultivation of genetically modified organisms

Genetically modified organisms grown at present can be classified into the following major groups:

- plants resistant to herbicides,
- plants resistant to insecticides,
- plants having both capabilities above,
- plants modified to have other properties (e.g.: drought-tolerant plants, plants resistant to viruses).

When establishing the strategy the following should be considered and paid attention to:

1. What benefits are offered by genetically modified organisms from the aspect of biodiversity conservation?

By growing genetically modified crops and keeping genetically modified livestock the rate of agricultural areas may be decreased in certain cases. In the course of protection against plant diseases, the intensive agricultural systems use a number of pesticides. It is well known that most of these chemicals intensively pollute the environment, therefore, it would be rational to shift the emphasis from the development of newer and newer pesticides to the breeding of crop varieties more intensively resistant to pathogens. This solution is available also by traditional plant breeding methods. If the tools of molecular genetics are also applied, the production time of the new varieties is shorter. By growing crops that have been made resistant to the different viruses, bacteria, fungi, insects, tolerant to drought and high salt content, in certain cases, the chemical use can be decreased.

There are areas of the application of genetically modified micro-organisms that can also be directly applied to the elimination of contamination and chemical residues in natural and residential areas.

In nature conservation areas, biotechnology methods can be primarily used for the accurate measurement of genetic diversity and, theoretically, in laboratory conditions, for the micro-propagation (plants) and cloning (animals) of threatened species with a decreased number of individuals.

2. *What hazards are posed by the genetically modified organisations against species and genetic diversity?*

Certain non-target organisms may also fall victim to the compounds produced by the gene inserted into genetically modified plants to make them resistant to insects. Similarly, the plants resistant to herbicides have been developed in order to possibly destroy all plants other than cash crops. With this, gene technology is in fact reinforcing the tendency that less and less living beings find opportunities of living on agricultural areas. Consequently, biodiversity may decrease at a critical rate.

Some experience shows that the cultivation of genetically modified crops may, in certain cases, increase chemical use. Obviously, the larger quantity of chemicals may cause major damages in the biosphere, moreover, when getting into waters they may have a detrimental impact on places distant from the site of release.

Experimental evidences are available to show that the transgene may be transferred from a genetically modified plant to a close wild relative plant variety. Due to the new gene, this latter plant may have a selection preference and may suppress other species.

In case farmers find it more profitable in the short term to grow/breed genetically modified varieties, other varieties may disappear from general cultivation and be restricted to gene banks in better cases. The individuals of the genetically modified varieties, however, are genetically almost identical, which means they are intensively vulnerable to pests and the different environmental changes. All these also imply the reduction of food supply safety.

Agricultural gene technology may pose a problem not only in terms of biodiversity conservation. On the one hand, a further risk is generated by the consumption of genetically modified foodstuffs, on the other hand, social-economic hazards also emerge (critical increase of our dependency on e.g. the giant biotechnological companies and the technology itself, the upsetting of the traditional farming pattern). Furthermore, a number of moral issues are also raised in relation with the applications of gene technology in agriculture.

3. *Are the objectives of agricultural gene technology necessary, and if they are, how can they be achieved by other tools more favourable for the conservation of biodiversity?*

The advocates of the production of genetically modified organisms and their application in agriculture argue that food produced in the world is not sufficient and as a result a lot of people starve. The problem, however, is not with the insufficient quantity of food but with its uneven possession and regional distribution.

Even if we were to increase production in Hungary, traditional breeding still has major reserves. The production potentials of our existing varieties are currently utilised only in part. The reserves of traditional breeding are still far from being depleted. On the basis of the varieties list of the National Institute for Agricultural Quality Control, farmers may choose from among different varieties. The existing range of varieties satisfies all producer demands, and even the varied demands of different production sites and farming standards are met.

Chemical application can be significantly decreased also by applying traditional farming methods, which have a lower capital, technology and energy demand and are less knowledge intensive, and which apply solutions based on accumulated local knowledge.

From what has been discussed above it is clear that the application of gene technology in crop production implies many more hazards than potential benefits for the conservation of biodiversity. Therefore, in the interest of biodiversity conservation, it would be better to give preference to environmentally friendly methods in Hungary's agriculture in line with the objectives of our National Agro-environmental Programme, and the National Rural Development Plan. On the other hand, genetically modified microorganisms could be used in environmental protection and nature conservation.

Other applications of biotechnology

A number of biotechnological breeding methods have become known in agriculture and animal husbandry for the realisation of some practical targets that allow us, for example, to cross species that are distant relatives, to select embryos on the basis of their sex, and to clone them by cutting them into pieces. These procedures may be appropriate in biodiversity conservation as well when applied, in the given case, with adequate care and caution.

Non-biotechnological molecular methods

Modern molecular biology has developed a number of routinely applied methods for assessing the genetic diversity of species, identifying certain individuals, varieties and ecotypes by applying molecular methods, moreover, determining and describing microbial species diversity. The different analysis methods based on the separation of different protein products transferred from genes have been used extensively since the 1960s. In addition to these tests, the methods concerning diversity and conducted on DNA level have also been acquiring an increasing role recently.

When coupled with carefully selected sampling, molecular methods may provide rather important information on the magnitude, dynamics, historic events and conservation potentials of biodiversity, this is why they have become an almost indispensable part of all research plans on biodiversity conservation.

STRATEGY

- It is a major strategic task to create the decree on the implementation of the Cartagena Protocol on biosafety, the international regulation on genetically modified organisms, and the implementation of the provisions contained therein, and inspection.
- Like all technologies, biotechnology also requires adequate expertise and an introduction performed with due care. Safe application requires that the technology must be regulated. Since biotechnology methods and science are making constant progress, legal regulation must follow this progress. Bearing in mind its own interests, Hungary must take part as a Member State in the creation of legislation of the European Union and must create the legislation falling into scope of its national competence.
- In the course of the authorization procedure, the applications for permit must be decided on case by case, considering all potential benefits and risks, paying full attention to the precautionary principle, and bearing in mind the conservation of the characteristic features of the Pannon eco-region.

- The deliberate release of genetically modified organisms into the environment should be monitored following the release as well, and their impact on the environment and human health should be continually monitored. Therefore it is necessary to establish the background organisation intended to control the products made of, or containing in part, genetically modified organisms.
- Provision of information, training, access to information is fundamental prerequisites to activities pursued in relation with genetically modified organisms.

ACTION PLAN

- The tasks arising from the Cartagena Protocol on biosafety must be continually implemented. A laboratory designated for this purpose and suitable for the detection of genetically modified organisms must be operated. Regular inspections should be organised and the necessary financial sources should also be provided. An information system (clearing-house mechanism) should be operated containing different types of information on the living, genetically modified organisms (e.g.: international conventions, European Union and national legislation, how to contact competent authorities, scientific publications, information materials, information on permits issued).
- Import items coming into Hungary should be inspected randomly to see if they contain GMO contamination, if it is indicated on the label, and on the shipping documents accompanying the consignment. The entry of illegal consignments should be prevented by all possible means.
- The existing laws should be continuously reviewed in the light of the latest biotechnology methods and scientific results. Among others, legislation should be created providing for the co-existence of the production of genetically modified organisms and organic farming.
- The deliberate release of genetically modified organisms into the environment must be monitored also after the release. Relevant information must be collected, data must be continually analysed, and the experts and the public also must be informed of the results. It is necessary to include the legal, ethical and risk related issues of genetically modified organisms into the appropriate higher education (on agriculture, biology, chemistry, technology and medical science, etc.).
- The public should be given the opportunity to be involved, in line with the legislative provisions, in decision-making related to genetically modified organisms.
- Methods for the detection of genetically modified organisms should be adopted and gradually improved.
- In the authorization procedure, a detailed ecological impact assessment should be performed of each genetically modified organism in order to decrease to the lowest level the environmental risks posed by genetically modified organisms.
- Information materials must be prepared and presentations must be held for the public on the genetically modified organisms. The experts working in this area on behalf of the authorities should also be given continuous training to help them have a clear understanding of the most recent findings, methods and tendencies.
- The application of gene technology in crop production implies many more hazards than potential benefits concerning the conservation of biodiversity. Therefore, in the interest of biodiversity conservation, it would be advisable to give preference to environmentally friendly methods in Hungary's agriculture in line with the objectives of our National Agro-environmental Programme.
- As part of their field of application, genetically modified micro-organisms can also be directly applied in the elimination of contaminants and chemical residues in natural and

residential areas. Wastewater, extremely polluted industrial cooling waters and even slurry generated at livestock farms can be treated by the so-called biological waste water treatment where the different types of pollution are neutralised by micro-organisms converted by molecular genetic methods to become suitable for the task. Large amount of the solid phase waste at municipal and hazardous landfills can also be degraded by special microbes. Another important field of the application of microbial biotechnology for environmental protection purposes is the recultivation of the waste stockpiles generated as a by-product of mining.

INSTITUTIONS CONCERNED WITH THE IMPLEMENTATION OF THE TASKS IDENTIFIED IN THE ACTION PLAN

Ministry of Agriculture and Rural Development and its institutions, Ministry of Environment and Water and its institutions, Ministry of Economy and Transport and its institutions, Ministry of Health and its institutions, Ministry of Education and its institutions, Hungarian Academy of Sciences and its institutions, media, non-governmental organisations.

XI. APPENDICES

XI/1. Hungarian regulations directly determining and influencing the conservation and sustainable use of biodiversity and the conservation of nature (laws, concepts, programmes)

- Act XX of 1991 on the roles and responsibilities of local municipalities and certain centrally subordinated agencies
- Act XLVIII of 1993 on mining
- Act LV of 1994 on arable land
- Act LIII of 1995 on the general rules of protection of the environment
- Act LVI of 1995 on environmental protection product charges
- Act LVII of 1995 on water management
- Act LXXXI of 1995 on the Convention on Biological Diversity
- Act LXXXII of 1995 on promulgation of the United Nations Framework Convention on Climate Change
- Act XCIII of 1995 on restoring the level of protection for protected natural areas
- Act LIII of 1996 on nature conservation
- Act LIV of 1996 on forests and the protection of forests
- Act LV of 1996 on game protection, game management and hunting
- Act XLI of 1997 on fishing and angling
- Act CVII of 2003 on promulgation of the United Nations Convention to combat desertification in countries experiencing serious drought and/or desertification, particularly in Africa
- Act LXVII of 2004 on the public interest in and implementation of the programme to increase flood security of the Tisza Valley and regional and rural development in the area concerned (Further Development of the Vásárhelyi Plan)
- Parliament Resolution No. 132/2003. (XII. 11.) on the National Environmental Programme for the period 2003-2008 (NEP II.), and the National Nature Conservation Master Plan for the period between 2003-2008
- Act XXVII of 1998 on gene technology activities
- Act LXXXI of 2001 on promulgation of the Convention on access to information, public participation in decision-making and access to justice in environmental matters, adopted in Aarhus on 25 June 1998
- Act XCVII of 2001 on promulgation of the Agreement on the participation of the Republic of Hungary in the European Environment Agency and the European Environmental Information and Monitoring Network
- Government Decree No. 74/2000. (V. 31.) on promulgation of the Convention on Cooperation for the Protection and Sustainable Use of the Danube River done in Sofia on 29 June 1994
- Government Resolution No. 2078/2001. (IV. 13.) on the subsequent approval of signing the Protocol on Water and Health related to the Convention on the Protection and Use of Trans-boundary Water Courses and International Lakes (Helsinki Convention)
- Government Resolution No. 1033/2004. (IV. 19.) on the pro rata review of the contents of the Government Resolution No. 1075/2003. (VII. 30.) and further measures related to the

Lake Balaton

- Government Resolution No. 2083/2003. (IV. 24.) on the implementation of integrated river management
- National Biodiversity Monitoring System (1997-)
- Government Resolution No. 2253/1999 (X. 7.) on the National Agro-environment Programme and the measures required for its implementation
- National Rural Development Plan
- Hungarian Strategy Document for Implementing the Water Framework Directive (2002)
- Asset management concept (2003)
- Forestry concept of nature conservation and long-term development tasks (2004)
- Game management and hunting concept of nature conservation (2004)
- Backwater Programme

European Union and Pan-European documents related to biodiversity conservation

- National Development Plan (2003)
- Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds
- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora
- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy
- Pan-European Biological and Landscape Diversity Strategy (1996)
- European Community Biodiversity Strategy (1998)
- Principles for the new Biodiversity Strategy for the European Community – Message from Malahide
- Council Regulation (EC) No 338/97 of 9 December 1996 on the protection of species of wild fauna and flora by regulating trade therein
- European Union Biodiversity Action Plans (2001)
- Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of the Regions towards a thematic strategy for soil protection (COM(2002) 179)
- Directive 2001/18/EC of the European Parliament and of the Council of 12 March 2001 on the deliberate release into the environment of genetically modified organisms
- European Strategy Document for implementing the Water Framework Directive

Domestic non-governmental strategies used

- The programme for conserving biodiversity (Green Action Society, 1992)
- The basic principles for developing a national strategy for conserving biodiversity, (Hungarian Academy of Sciences, 1993)
- Environmental vision of Hungary, Hungarian Academy of Sciences (1994)
- Possibilities for conserving biodiversity in Hungary (WWF booklets issue No. 8, 1995)
- Strategic issues of domestic water management, Hungarian Academy of Sciences (2002)

XI/2. Key findings of the SWOT analysis (exploring strengths, weaknesses, opportunities and threats) that serves as the basis of the strategy

Strengths in the field of biodiversity conservation

- Hungary's natural characteristics allow for an abundance of species and variety of habitats.
- We have a rich, live natural heritage that deserve protection, in the variety of natural and semi-natural habitats, the abundance of species in our biosphere as well as its genetic diversity.
- There still are some areas, primarily rural areas, where the conditions for conserving an abundant biodiversity have survived in the long run.
- Most of our natural areas still have migration and gene exchange connections to the natural areas of neighbouring countries, and this exchange is implemented through relatively well-preserved ecological corridors. This allows for dynamic changes and a certain degree of regeneration in the natural wildlife of the Carpathian basin.
- Important taxonomic groups of wildlife (primarily plants) are quite well explored throughout the entire territory of the country, and we have relatively good knowledge about the communities typical for each habitat.
- The institutions of Hungarian nature conservation have a good professional and organisational history, the central administrative organisation is supplemented by a network of well-functioning regional bodies.
- Modern legislation regulates the conservation of nature and the sectors closely related to it (environmental protection, forest and game management, etc.), and through that, a number of fields of biodiversity conservation.
- Almost 10% of the Hungary's territory is subject to nature conservation, in addition to which there is also the legal concept of conservation of species outside protected areas and habitat protection. This is implemented in the development of the Natura 2000 network, that is mandatory in accordance with EU directives, and as a result the ratio of areas subject to a certain degree of protection increases to nearly 21 % together with protected natural areas.
- We managed to prevent a further decrease in the population of certain endangered species, and furthermore, the population of some species even increased.
- After privatisation, the purchase of protected natural areas for the state managed to prevent a reduction in the level of protection, and to eliminate the conflict that arose out of having a different owner and a different user in many places. On the other hand, new conflicts of interest have emerged.
- Farming has been eliminated or its elimination is in progress in areas with extreme characteristics, particularly those with a low fertility, therefore the natural condition is restored spontaneously (regeneration succession). In some locations this resulted in increased biodiversity.
- The national programme for monitoring the condition of biodiversity is in operation (National Biodiversity Monitoring System).
- An ecological network was created in the country, and protection for the network was integrated in legislation on regional development and regional planning.
- Agricultural biodiversity is rich, and we managed to preserve and maintain the use of quite a number of landraces.
- The institutions for preserving species and varieties have been developed and operate at a

high level.

- The production, utilisation, trade and cultivation of genetically modified organisms are regulated by law.
- Hungary has joined all international agreements related to biodiversity conservation and executes the obligations assumed under these agreements.
- Fulfilment of the National Agro-environment Programme started; it helps to support agricultural methods that are environmentally friendly and serve nature conservation and landscape protection.

Weaknesses in biodiversity conservation

- A significant part of the country's territory is intensively cultivated, as a consequence of which natural habitats have been mostly destroyed in large areas.
- In some places, the habitat patterns of complete regions changed, and certain types of habitats, which were originally present extensively in the country's natural picture, were almost completely destroyed (hardwood groves in flood plains, loess oak forests, loess grasslands, sandy oak woods and grasslands etc.).
- The proportion of territory occupied by infrastructure and residential buildings is high.
- The ecological condition, particularly water balance of certain regions has changed irreversibly due to human impact (e.g. the Great Plain, certain karst areas).
- The infrastructure developments – particularly the highway constructions launched – increase the fragmentation of habitats and constitute obstacles to migration and genetic exchange.
- Production and consumption habits changed in a number of rural regions, and the traditional interaction between man and nature was converted. Human intervention to maintain a natural landscape will slowly cease to exist (grazing, mowing, fallow areas), as a consequence of which nature-like habitats (upland meadows, hayfields in flood plains, grazing forests, extensive orchards, etc.) are also shrinking.
- Watercourses traversing the country and their valleys as ecological corridors have been endangered as a consequence of various water management interventions and water pollution.
- In the absence of appropriate research capacity and financial support, we do not have sufficient knowledge about the principles of various populations and their reactions to human intervention. We do not have enough knowledge about the chain reaction type processes that take place in ecological systems and entail a reduction of diversity and deterioration of function.
- The institutional tasks of nature conservation still include unsolved problems, such as performing the increasing asset management tasks.
- Nature conservation institutions regularly suffer from lack of funds and staff.
- There still are gaps in legislation, primarily in the field of liability insurance, assistance and compensation.
- In sectoral decisions, the interests of nature conservation are still often subordinated to short-term economic interests.
- Outside of protected natural areas, conservation and sustainable use of biodiversity suffers from a number of deficiencies, and its institutional system has not evolved yet.
- The biodiversity of some areas is in a strong decline, primarily due to the continuously increasing demand for using areas adjacent to residential areas.
- The privatisation of forests (also) brings about unfavourable processes. The proportion of

non-native species in the newly afforested areas continued to increase due to the lack of capital and specialist knowledge of the new forest owners as well as their being interested in short-term profit. The proportion of forests with an unsettled ownership situation and temporarily abandoned areas subject to the burden of regeneration is quite high due to the postponed privatisation.

- Despite the potentially rich agricultural biodiversity, the application of local and adapted species is decreasing in practice in terms of both number and the proportion.
- Genetic risk has not decreased despite the law on regulating genetically modified organisms, because the impact on non-target organisms and the indirect environmental reactions are not assessed and therefore we have no knowledge on them.
- Classical nature protection continues to play a dominant role in protecting biodiversity. There are very few initiatives in other sectors for the conservation of biodiversity and the sustainable use of its components.
- Knowledge and technology related to sustainable landscape and resource use are lacking.
- There is no political will for creating an integrated environmental policy and its institutions, which is necessary for protecting biodiversity and the sustainable management of natural resources.
- In the set of social values, biodiversity does not have due respect, people do not understand how closely the quality of their lives is related to the values of biodiversity.
- Biodiversity protection is not emphasised enough in education, and there is no holistic approach for the relationships between environmental issues.

Possibilities for biodiversity conservation

- A developing legislative background, which already provides an appropriate framework.
- Extension of protected natural areas, development of the Natura 2000 network, implementation of the Agro-environment Programme, the Sensitive Natural Areas, and the National Ecological Network designated as part of the Pan-European Ecological Network.
- Application of technologies that are less destructive or may even have positive effect on biodiversity in the course of the development of a low energy-input agriculture and ascending economic production.

Factors and processes threatening biodiversity conservation

- Rearrangement of land use needs, extension of the territory of agglomerations, increased demand for area used such as greenfield investments, mass tourism, commercial plant cultivation monocultures, and afforestation with non-native tree species will further reduce biodiversity.
- Further development of infrastructure, primarily line facilities may increase the fragmentation of the spatial structure of the landscape and may lead to a decrease of natural areas, fragmentation of habitats, and the isolation of natural populations.
- Regional and rural development programmes that ignore the natural, landscape and cultural diversity may change the relatively favourable condition rural areas.
- Nature conservation may start to lack funds because the capital-intensive nature of environmental protection investments that are lagging behind in connection with accession to the European Union, such as canalisation and waste disposal, may tie up

development resources.

- Decision-makers do not apply the basic relationships between biodiversity, the economy and the quality of life sufficiently in daily politics.
- The social values lean towards the acquisition of material assets, while the increase in consumer needs and the pressure on resources significantly deteriorate the condition of biodiversity in Hungary.
- Society uses natural values badly, in an unsustainable way, and sacrifices values for short-term goals on the altar of profitable sectors.
- Certain groups of society and companies are poor and lack resources. Consequently, the conservation of natural values and sustainable management of natural resources are applied only slightly in the course of their operation, if at all.
- Certain incentives and legal regulations try to reduce the assumed or actual lack of resources by requiring short-term profit orientation also in sectors where it is against the conservation of natural values.
- Genetically modified organisms, which may threaten natural populations, are gaining ground.
- The accidental or intentional introduction of non-native species is a serious threat in terms of biodiversity conservation because it carries the risk of invasion.
- The sections of our large rivers both outside and within the borders may be loaded with known and unknown pollutants. As a result, waters may be subject to ecological damage and even disasters.