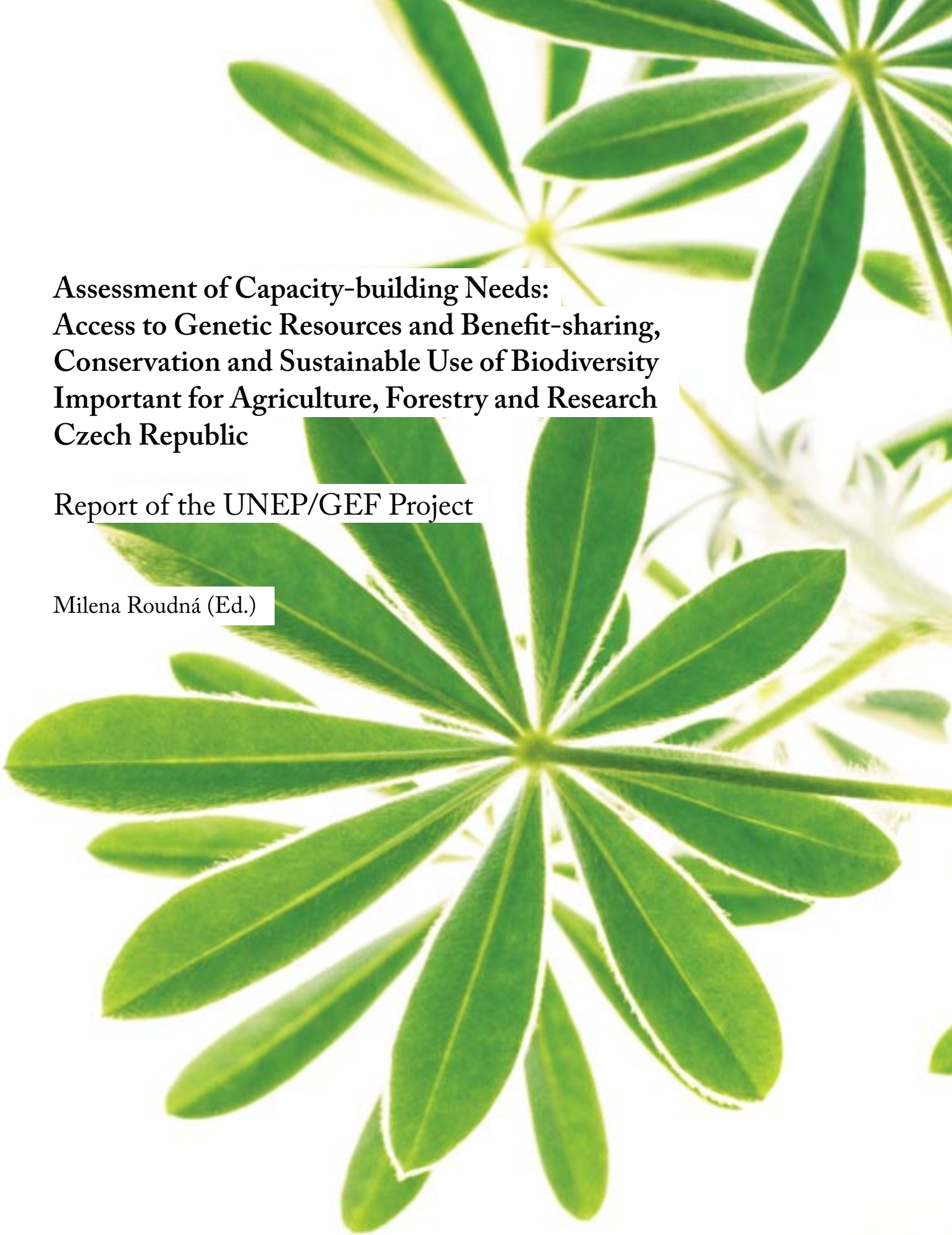

Assessment of Capacity-building Needs: Access to Genetic Resources and Benefit-sharing, Conservation and Sustainable Use of Biodiversity Important for Agriculture, Forestry and Research Czech Republic

Report of the UNEP/GEF Project

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Forests of the Czech Republic – valuable genetic resources, fragile and by man endangered ecosystems and subject of hot discussions.

Introduction

A. HISTORY AND BIODIVERSITY RELATED ACTIVITIES BEFORE THE PROJECT

Nature conservation has a relatively long tradition in the Czech Republic. The whole system of large- and small-size Specially Protected Areas has been established since the 1830s. The first areas conserved *in situ* – primeval forests in the South Bohemian mountains – were declared in 1838 (two virgin forest stands in the Novohradské Mountains) and in 1858 (the famous Boubín Virgin Forest). During the following decades the growth of protected areas has continued, both in numbers as well as in their total area, especially in the past eight decades.

In 1955, the Czech Republic established its first Protected Landscape Area, a category equivalent to the international IUCN Category V (IUCN 1994), in the following year officially recognised by the first Czech State Nature Conservation Act No. 1/1956. The intention was to establish a special territorial protection at a level allowing a sustainable use of resources and soft tourism. This category of protected areas should also serve as pilot areas for an ecologically sound management of countryside and correspond to the objectives of the UNESCO Biosphere Reserves (BR) and therefore the establishment of Protected Landscape Areas and Biosphere reserves was in many cases a mutually supporting process. The total number of Protected Landscape Areas is now 25 (the last one established in 2005) covering an area of 10 874 km^2.

The first Czech National Park was established in Krkonoše (Giant Mountains) in 1963. According to international classification, it belongs to the IUCN Category V, because of a strongly developed tourism, and during the last few decades also due to ecosystem (mainly forest) destruction caused by atmospheric emissions. Two more National Parks were established in 1991: the Šumava (Bohemian Forest) NP in South Bohemia, and the Podyjí (Thaya River Valley) NP in South Moravia. The National Park Czech Switzerland was declared in 2000.
The geographical situation of the Czech Republic caused that many protected areas are located close or even adjacent to the state frontier, and most of them have their continuation in biological and landscape diversity as well as in conservation status across the border, which enhanced their importance due to transboundary biodiversity conservation. All 4 Czech National Parks have such character.

An increase in species protection in the Czech Republic can be observed since 1970s which resulted in publication of the first Czech Red Lists of threatened species at the late 1970s and the early 1980s, with the objective to give a more comprehensive overview of the situation, and to identify the species deserving a special protection along threatened categories determined on a scientific base.

New approach to biodiversity conservation at all levels including monitoring and management of species, habitats, biotic communities and ecosystems started in late 1960s. Many new methods, only half a century ago strictly rejected by scientists and conservationists, such as gene banks and cultivation *ex situ*, re-introduction and transfers (of species), rehabilitation, restoration (of habitats, communities and ecosystems), and some special facilities (such as centres for handicapped animals) have become part and generally accepted methods of conservation activities.

During the 1980s the Territorial System of Ecological Stability of Landscape was established representing the Czech Republic contribution to the Pan–European Ecological Network (PEEN) and important tool of protection outside specially protected areas.

Within NATURA 2000, 38 bird areas were declared and 863 proposed as important habitat and species localities at European level.

Ex situ conservation started at the beginning of the 20th century. Some research and breeding stations gathered and conserve local landraces and bred cultivars of agricultural and garden crops. Certain collecting activities begun in 1930s, systematic collections of landraces and wild relatives in 1960th. A system of cyclic regeneration was implemented and since 1976, long-term storage under controlled conditions has started. A special Gene Bank was completed in 1988 at the Research Institute of Crop Production, Prague. Genetic resources studies were oriented on evaluation of the most important biological and agronomical characters, with respect to the effective utilization of genetic resources in breeding and agricultural practice. Systematic collection of reproduction material of forest trees begun in the first half of the 19th century. Some important

plant collections, especially historically valuable, are conserved in botanical gardens (first Botanical Garden established as early as in 1775 in Prague, as part of the Charles University). Special conservation programmes on rare or endangered animal species and campaigns have been developed in the Czech zoological gardens in cooperation with international organizations (first Zoological Garden established in 1919, in Liberec, Northern Bohemia).

In 1993, the Czech National Programme on Plant Genetic Resources Conservation and Utilization was launched by the Ministry of Agriculture. Eleven research institutes and universities have joined the programme and through effective coordination and rationalization of all activities, documentation, study, conservation and use of plant genetic resources have been significantly promoted. Also international cooperation has been extended significantly during this period.

Central authorities for biodiversity and genetic resources conservation represent the Ministry of the Environment and the Ministry of Agriculture. Some specialised institutions under these ministries play a significant role in biodiversity study and management, and district and local authorities in implementation of biodiversity conservation measures. The Academy of Sciences of the Czech Republic and universities are other important centres of basic and applied biodiversity research.

The main legislation in biodiversity conservation represents the Act No. 114/1992, on Nature Conservation and Landscape Protection, amended as the Act No. 218/2004 which is in corresponding parts comparable with the European Community legislation (Birds Directive, Habitats Directive). This Act and corresponding Decree guarantee protection of critically endangered, highly endangered and endangered selected species (several hundreds) of plants and animals. As to agricultural genetic resources, the Act No. 148/2003, on Conservation and Utilization of Genetic Resources of Plants and Micro-organisms Important for Food and Agriculture is the key instrument with corresponding Decree No. 458/2003. Farm animals are legally protected since 1991, when special Act on Farm Animal Improvement was adopted, amended in 2000. The Act stipulates and defines duties and rights of authorized persons, farming associations and individual breeders. After the Czech Republic joined the EU in 2004, the amendment of the Breeding Act and a special Decree on Farm Animal Genetic Resources were prepared, entering into force in 2006. This amendment constitutes, inter alia, the definition of the genetic resources and prescribes at large arrangements to provide the national programme of their conservation. In forestry, the main legal instrument is the Act No. 289/1995 on Forests, for genetic resources completed by the Act No. 149/2003, on Circulation of Forest Reproductive Material of Important Forest Species and Artificial Hybrids intended for Regeneration and Re-forestation, which fully implements Council Directive 1999/105/EC on marketing of forest reproductive material, further the Decree No. 29/2004 to this Act, as well as the Decree No.139/2004 on Transfer of Forest Tree Seed and Planting Material and Register of Origin of Reproductive Material.

The Czech Republic ratified all major conventions, corresponding protocols or agreements related to biodiversity and genetic resources conservation, among them:
Convention on Biological Diversity (3.12.1993) and Cartagena Protocol on Biosafety (8.10.2001), International Treaty on Plant Genetic Resources for Food and Agriculture (2004), Convention on Wetlands of International Importance (1990), Convention on International Trade in Endangered Species of Wild Fauna and Flora (1992), Convention on the Conservation of Migratory Species of Wild Animals (1994), Agreement on the Conservation of Bats in Europe (1994), Convention on the Conservation of European Wildlife and Natural Habitats (ratification 1998), Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa (2000), Convention Concerning the Protection of the World Cultural and Natural Heritage (1990), European Landscape Convention (2004) or Convention on Access to Information and Public Participation in Environmental decision-making and Access to Justice in Environmental Matters (Aarhus Convention, 2004).
The Czech Republic closely co-operates with respective Secretariats in issues related to the implementation of conventions and with international organisations dealing with the environment, such as UNEP, Council of Europe, Commission on Sustainable Development (CSD), IUCN–The World Conservation Union, BirdLife International or Wetlands International.

B. RATIONALE FOR THE PROJECT

After entry into force of the Convention on Biological Diversity, the Czech Republic, similarly as many other Parties to the CBD, devoted most attention to the first objective of the Convention – namely conservation of biodiversity. The Czech Republic received biodiversity enabling activity assistance initially in the amount of USD 101,000 to support the preparation of the National Biodiversity Strategy and Action Plan and the First National Report to the Convention on Biological Diversity (CBD). This phase begun in 1999 and was completed at the end of 2001. These activities were undertaken by specialists

under the coordination of the Biodiversity Unit established at the Ministry of the Environment, with the World Bank as the GEF Implementing Agency.
Nevertheless, further development and COP negotiations revealed the importance of two other main objectives of the Convention - sustainable use and equitable sharing of benefits, to which efforts are now being focused.
During the CBD implementation in the Czech Republic, it came clearly out that not only *in situ* conservation is important, but that also valuable *ex situ* collections due to tradition in collecting and conservation activities in the country play a great role and in certain cases contribute to saving of rare or endangered species, varieties or breeds at regional or even global level. In this process inter-sectoral cooperation and inclusion of biodiversity interest into sectoral strategies and policies appeared as indispensable.

- For this reason the main objectives of the presented proposal are summarized as follows:

- To assess capacity building needs in priority areas for access to genetic resources and benefit sharing, and for conservation and sustainable use of biodiversity important for agriculture and forestry.

To assess capacity building needs and to define country priorities in developing strategies and adopting measures for *ex situ* conservation (specialized collections) and sustainable use.

Therefore representatives of different sectors and disciplines were selected as members of National Coordination Team, namely from agricultural, forestry, botanic and zoological gardens, environmental and academic fields – legislation, fungi.

Executive Summary of Work Covered in the Project

Introduction

The final report summarizes conservation status and access and benefit-sharing principals applied so far and proposed measures in the following main areas:
Agricultural and garden crops, farm animals, forest species, botanical gardens, zoological gardens, fungi.

Methods Used

The following main methods were used to get required information, made inventory and formulate proposals:

- Identification and consultation with stakeholders.
- Information and experience exchange during thematic workshops.
- Analysis of information obtained and proposal of recommendations.
  (More details see Chapter II.)

Results Obtained

Surveys on the present status of genetic resources in the 6 focus areas (agricultural and garden crops, farm animals, forest species, botanical gardens, zoological gardens, fungi) were made.
Related stakeholders were contacted and their list compiled.
Access to genetic resources and sharing of their benefits were analysed with respect to international activities and national capacities.
SWOT analysis was used to identify strong and weak points.
In line with international legally binding documents and national legislation, models of the Material Transfer Agreement were prepared in the sphere of agricultural crops and farm animals and their use recommended to all providers of genetic resources.
Possibility to use IPEN system in the Czech Botanic Gardens has been studied and an international workshop on this topic organized.
Analysis of the Bonn Guidelines implementation in the Czech Republic was made, with respect to general measures, role and responsibility of users and providers, participation of stakeholders, measures taken in ABS implementation and other measures (summarized in Chapter III. Shorter summary presented during 4th Meeting of the Ad-hoc Working Group on ABS, Granada, January 30, 2006).
Main outputs of the Project were summarized, strategy and further required measures proposed.

Way Forward for Implementation of the Issues Raised in the Project

Some common problems have been identified in different groups, which are summarized in Chapter IV. They can be grouped in the following areas:
- Scope and capacities available.
- Effectiveness in management and use of genetic resources.
- Modern methods and technology application.
- Enhanced coordinated research and monitoring.
- National legislation reflecting new trends and approximated with regional and global legally binding instruments.
- Education, raise of awareness and communication.
- International cooperation.
- Fund raising and their flow monitoring at national level.

Methods Used to Implement the Project

In line with the main objectives of the project two working groups of experts representing different sectors (Ministry of Agriculture, Ministry of the Environment, Academy of Sciences) were established to provide more detailed inputs and advice on each key theme of the assessment, and to lead consultations with stakeholder groups:

1. Working Group on Access and Benefit Sharing (coordinator Ladislav Dotlačil).
2. Working Group on *ex situ* Collections (coordinator Vladimír Řehořek).

The activities were focused into the following groups of genetic resources:

- Agricultural and garden crops.
- Farm animals.
- Forest tree species.
- Botanical Gardens.
- Zoological Gardens.
- Fungi.

The results of both working groups were summarized in one report for each focus area and form part of the final Report and its Annex (thematic reports in detail).

Several case studies were prepared by specialists in the following fields:

- Genetic diversity and its temporary changes in the assortments of winter wheat and spring barley grown in the Czech territory in the last century.
- Education for raising awareness of genetic resources: Examples of old breeds and their traditional use.
- Conservation of wild plant and animal species *in situ*.

Giant Mountains – First National Park of the Czech Republic

- Conservation of valuable trees as a part of landscape and specialized collections.
- Dendrochronology and its practical use.
- Biodiversity of meadows, their revitalization and strategy of conservation.
- Botanic Gardens collections – their history, importance and use.
- Zoological Gardens and their role in biodiversity conservation.

As a cross-cutting issue three legal analyses were elaborated on:

- Relation between Biodiversity Conservation and Trade-related Aspects of Intellectual Property Rights.
- Legal Aspects of Genetic Resources Access and Benefit-sharing.
- Liability of Damage Related to Transboundary Movement of Living Modified Organisms.

In each focus area corresponding stakeholders were identified and consulted to collect required information. Updated inventory of both *in situ* and *ex situ* genetic resources were made. Available information on access to genetic resources, their use and benefit sharing were collected and analysed. For agricultural plant genetic resources and farm animals genetic resources models of Material Transfer Agreement were proposed and recommendations for their implementation elaborated. The conditions for the Bonn Guidelines implementation in the Czech Republic were analysed from the point of view of adopted general measures, role and responsibility of providers and users, involvement of interested stakeholders, measures taken to implement ABS principles, other measures (see Chapter III).

Thematic workshops were organized (see Chapter V) enabling exchange of experience and/or sharing information with interested stakeholders and enhancing public awareness.

Survey on existing international cooperation in area of genetic resources was prepared, present status analysed and proposal for future activities formulated, in support of access and benefit-sharing.

On the basis of obtained information priorities in genetic resources conservation, access and benefit-sharing were identified and further measures (including recommendations for existing programmes, especially National Programme on Conservation and Utilization of Genetic Resources of Plants and Micro-organisms Important for Agriculture) and certain strategy proposed.

Results

Detailed reports for all focus areas are annexed to this Report, containing present status of *in situ* and *ex situ* conservation measures, including **legislation (a), specific threats to biological diversity (b), monitoring programmes (d), agriculture biodiversity (e), incentive measures (f) and ABS (g)**.
In this chapter main results are summarized regarding present status of genetic resources, their access and use.

Agricultural and Garden Crops

Detailed inventory of crop genetic resources has been carried out and current data were completed by newly obtained information, including recent data on viability and accessibility of accessions and regeneration needs (see chapter 2.3 *Status of agricultural and garden crop genetic resources in 2005* of the detailed report).

In addition, monitoring system on plant genetic resources conserved in the Czech Republic *ex situ* as well as *in situ* has been developed in the framework of the National Programme on Conservation and Utilization of Genetic Resources of Plants and Micro-organisms Important for Agriculture. This system serves also as early warning system on plant genetic resources. The aim is to avoid losses of genetic resources and/or genetic erosion (in the sense of the Act No. 148/2003). The system is linked to national information system on plant genetic resources (EVIGEZ).
Steps have been taken to diminish hazards to plant genetic resources, to increase their safety and availability as essential preconditions to guarantee access to plant genetic resources. Strategy has been elaborated for particular groups of crops with respect to the status of genetic resources (bred cultivars, landraces, wild relatives), with special attention to resources of local origin. To reach these goals, effective methodology has been worked out, as a part of Methodology for the National Programme (see detailed information on http://genbank.vurv.cz/genetic/nar_prog/ where Annual Report, Methodology of the National Programme, adopted priorities and other relevant information are available). Further related information can be found on: http://www.pgrfa.org/selectcountry.jspx or: http://www.pgrfa.org/gpa
Measures were suggested how to enhance access to plant genetic resources (including prompt and appropriate regeneration, safe conservation and effective evaluation and documentation). The results and recommendation were discussed with stakeholders and adopted by the participants of the National Programme on Plant Genetic Resources and Agro-biodiversity Conservation and Utilization to strengthen the capacity building in the framework of the Programme. Access to PGRFA will be guarantied under the terms of the International Treaty on PGRFA and in harmony with national legislation.

In line with international and national legislation, a Material Transfer Agreement has been prepared (see Annex) and recommended to all providers of plant genetic resources in the country. Relationship between providers and users has been clearly defined, with respect to access and benefit shearing principles.

Farm Animals

Access to animal genetic resources is so far not subject to any legally binding multilateral agreements and according to the EU Patent Directive animals are patentable under the Directive provided there is an *invention* and that it fulfils the patent terms. The term *animal variety* is not clearly legally defined (as plant variety is in the UPOV conventions).

Report analyses status in the Czech Republic where access to and exchange of animal genetic resources is not specifically regulated by national legislation, respecting global principles of private ownership of animals. This property right implies a right to the physical material, e.g. the right to use and sell it for propagation purposes. As a large part of the genome of each individual is common within the breed, the owner of an animal cannot prevent others from using the same genetic components if they are found in their individuals. However, if the individual animal express a very specific inherent combination of genes, its owner will have a practical possibility to exclude others from using this genetic combination. The access to animal genetic resources is based on the exchange of propagating material regulated by private (commercial) law agreements and a common understanding among breeders of the rights associated with the material, and is functional. The Government activity is largely

limited to ensuring that various breeders societies that wish to be recognised under the EU breeding legislation covering livestock species, meet the necessary requirements. These set out basic rules regarding entry of animals into herd books, animal identification and recording, testing, and also set rules for production and trade propagating (genetic) materials.
So far no internationally negotiated standard Material Transfer Agreement exists and parties can impose and undertake obligations regarding the use of the transferred material. (MTA proposed for stakeholders discussion annexed to the Report in detail). The health status of the herd might be an example of what can ban export of live animals or genetic material. Export of live animals claimed as genetic resources requires Ministry permission. In such cases access to animals supported by the National Programme might be limited.
Main information see: http//:www.vuzv.cz

Forest Trees

Gene resources of forest tree species represent sets of reproductive material of all tree species, regional, local and artificially bread populations used in forest regeneration and reforestation, and in scientific research. The sources are represented *in situ* by: gene-bases (reserves), certified stands for seed material collection (phenotype class A and class B), selected trees, and *ex situ* by: reproductive (seed) stands, seed orchards, mother stands, clone-archives and collections of reproductive material.

The genetic resources of forest tree species are considered to be freely accessible, with the exception of some poplar and willow clones, which are patented. Nevertheless in practice, certain limitation of access may exist, particularly to *in situ* sources, where the collection could be a little problematic and complicated due to field accessibility, legislation and necessity to follow of owners´ law. In some other cases satisfactory amount of reproduced material is not always available.

The database of forest reproductive material in the Czech Republic is available on the web site of FGMRI, Research Station Uherské Hradiště (http://www.vulhmuh.cz). On the web-site FGMRI (http://www.vulhm.cz) the database of explant archives of forest trees can be found.
The existing legislation does not cover the National Programme of Preservation and Use of Forest Genetic Resources, which causes a problem, partly solved by Act No. 149/2003. Another problem represents a complicated practical access to genetic resources of small private owners. The applying for exception from European Commission is needed for the genetic resources certified before entering into force of the Act No. 149/2003. The forest Act No. 289/1995 does not allow using reproductive material of forest trees from EU countries even for research purposes, which requires amendment of the Act.
Full recognition of forest genetic resources within the National Programme could support protection and use of forest genetic resources.

Botanic Gardens

Botanic Gardens have centuries long tradition in the territory of the Czech Republic and played an important role in introduction of useful and decorative plants, as well as in education and public awareness. Activities, including conservation of certain plants, were coordinated in the period 1968 – 2001 by the Advisory Committee of Botanic Gardens. Recently established Union of Botanic Gardens of the Czech Republic (2005) prepared the survey of the present status of the Czech Botanic Gardens collections. The Union has 26 members, but number of the Czech BG exceeds 50.

The total number of registered taxa is 73 100, but some of them are registered in two or more BG (due to missing digitalisation of data in many BG duplications cannot be excluded) and therefore the real number of taxa can be some 40 000. Cultivated decorative plants represent more than 50 %. Introduced exotic species are highly represented, especially succulent and carnivorous plants. 12 BG conserve in their *ex situ* collections several critically endangered and endangered plant species. 9 BG participate in re-introduction programmes, in cooperation with National Park (1) or Protected Landscape Areas (2). Conservation activities, including ancient domestic cultivars of decorative plants, should be extended. A new computer programme on BG plant registers is under development.

National legislation on Botanic Gardens, their activities and collections conservation is missing, as well as a special common programme on genetic resources. Exchange of plant material exists through Index Seminum. Adoption of rules enabling membership in International Plant Exchange Network (IPEN) are discussed with responsible staff of BG, supported by the Union of Botanic Gardens. Topical information can be found on the Union web-site: http://www.ubzcr.cz

Zoological Gardens

Zoos play an important role in preserving world fauna biodiversity, however their possibilities are limited by

a number of factors, such as insufficient space, funds or restricted cooperation with other institutions, including scientific ones. 15 Czech zoos (out of existing 16) together with 4 Slovak zoos are organized in the Union of the Czech and Slovak Zoological Gardens, which helps them to overcome certain restrictions. Since 1984 the Union edited the Yearbook containing data on kept animals. The zoos associated in the UCSZ bred in total 2621 animal taxa (species, subspecies) and domesticated animal breeds (as of 1.1.2005). All zoos participate in international breeding and conservation programmes primarily through the European Endangered Species Programme (EEP) of the European Association of Zoos and Aquaria (EAZA), and some Czech zoos are members of the Eurasian Association of Regional Zoos and Aquariums (EARAZA). The Czech and Slovak zoos participate in reintroduction of extinct animal species back into the wild or in strengthening dwindling populations or those with low numbers *in situ*. Over the past decade they have taken part in reintroduction projects for European fauna (Lynx, Grouse, Aurochs, Bearded Vulture and the Griffon Vulture) and for exotic species (Przewalski Horse, Scimitar-horned Oryx). In 2005 the cooperation between Czech zoos on *in situ* projects was intensified (European Bison, Bearded Vulture, European Ground Squirrel, Barn Owl, Little Owl, Black Stork and Przewalski Horse).

The genetic resources of Czech zoos (particularly those of endangered species) are considered to be a part of the global population and, in the framework of the international conservation programmes, are available to all subjects expressing an interest. However, a certain limitation in providing breeding material to foreign breeders exists, stemming from the specifics of the national legislation and the guidelines of the regional and state veterinary administration.

Czech zoos have a long-term experience in conserving biodiversity and genetic resources of the world fauna. They contributed to preservation of many animal species from extinction and even now they are involved in international programmes. Nevertheless, use of modern methods, such as DNA analysis, is a prerequisite for successful development of these activities for which wider cooperation with other research institutions and corresponding ministries is necessary.
(Information on history, present status and activities of the Czech zoos see publication prepared within the BEA Project – Jiroušek V.: Zoological Gardens of the Czech Republic and their Contribution to Biodiversity Conservation, and the Union of the Czech and Slovak Zoos website: http://www.zoo.cz)

Fungi

The research on the biodiversity of fungi in-situ is performed by educational institutions, namely by universities (competence of the Ministry of Education) and by cultural institutions, namely by museums (competence of the Ministry of Culture). The voluntary group of scientifically oriented experts, both professionals and well educated amateurs, deals with different scientific aspects of mycology. They are associated in the Czech Scientific Society for Mycology (CSSM), dealing both with microfungi and macrofungi, supervised by the Council of Scientific Societies of the Czech Republic. Diversity of macrofungi is focus of activities of its Section for mycofloristics. Recently members of the CSSM prepared the Red List of threatened and endangered species of macrofungi. Several members participated in projects on inventory research of macrofungi in protected areas. The number of macromycetes in CR may be estimated to about 4 000 - 6 000 species according to estimates in neighbouring countries. Well protected nature areas, old grown forests, steppes, peat bogs etc. represent to some extent natural collection of fungi *in situ*. In only two nature protected areas of the Czech Republic macrofungi are the main object of protection.

Twenty *ex situ* fungi collections have been registered in the Czech Republic, supervised by different national and international organisations (details see Annex to the Final Project Report - Report on Fungi).

Main legislation tool protecting fungi in-situ represents the Act No. 114/1992, on Nature Conservation and Landscape Protection, amended as Act No. 218/2004 and corresponding Decree No. 395/1992, which contains about 40 protected macrofungi. The new list consisting of 100 species of macrofungi has been prepared for the amendment of this Decree. NATURA 2000 does not contain any rules for fungi. The only possibility to use this legislative regulation for protection of fungi concerns the protection of habitats. In the Red Book of the Slovak and Czech Republic (Kotlaba 1995) only macrofungi are listed. The Act No. 148/2003 on Conservation and Use of Genetic Resources of Plants and Microorganisms Important for Food and Agriculture defines conditions and procedures of preservation, conservation and utilisation of *ex situ* collections. Conditions and procedures are adjusted in the National Programme on Conservation and Use of Genetic Resources of Plants and Microorganisms Important for Food and Agriculture.

General Analysis

(including all groups) concerning:

A. PRESENT STATUS

The analysis of the present status of plant, animal and fungal genetic resources in the Czech Republic has been done within the Project on the basis of information from cooperating stakeholders, with the aim to identify weak points and opportunities and propose actions and measures in support of access and benefit shearing. Even if plant, animal and fungal genetic resources are very specific, some common features could be found as concerns access and benefit shearing. Certain common problems relate to the framework for conservation, access and use of various genetic resources in the Czech Republic, as well as to general mechanisms of benefit sharing, e.g. as for cooperation and assistance to developing countries where some genetic resources originate.

As a project output, an essential overview of information on all monitored genetic resources has been prepared. Because of specific nature of each category of genetic resources it was not possible to assess meaningfully all monitored parameters for each group, however, despite this fact certain general conclusions and recommendations could be made.

The compared groups differ significantly with respect to **biodiversity** they represent. The diversity of species is largest in fungi (existing diversity can be only roughly estimated) and plant species in botanical gardens (around 10 thousand species), followed by zoological gardens (with 2 345 animal species in fifteen zoos of the Czech Republic). All these groups mentioned are primarily dealing with preservation of species (while fulfilling numerous other functions – cultural and recreational, educational and scientific); nevertheless botanical gardens also keep various varieties and cultivars of some ornamental plants (thus increasing also intraspecies genetic diversity). However by trying to conserve range of species, it is essential to maintain also a sufficiently broad gene base of genetic resources, which can be very difficult, especially in case of animal species.

Collections of agricultural crops are represented by limited diversity of species (1 280 species of agricultural and horticultural crops, medicinal and spicy plants and selected ornamental plants are maintained in the Czech collections), though genetic resources of forest trees and farm animals are represented even by narrower spectrum with 147 and 16 species respectively. Within this relatively narrow spectrum of individual species however forest trees and agricultural crops have high **intraspecies diversity** (clones, ecotypes, regional and cultivated varieties, genetic lines…) so that the number of genetic resources ranges in the tens of thousands (48,8 thousand of accessions in agricultural crops maintained *„ex situ"*, over 11 thousand accessions of forest trees in *„ex situ"* collections and further material in *„in situ"* conditions). In forest trees over 75 genotypes are conserved per each species, while the number is about half of that for agricultural crops (38 genotypes per species). The gene pool of farm animals includes 35 native breeds (1 to 7 breeds for each species); however the important thing is to maintain a sufficiently broad genetic base for these breeds.

As this brief overview shows, zoological and botanical gardens are, in accordance with their purpose, primarily focused on preserving diversity of species, while in case of farm animals there are native breeds from only several species. Nevertheless, botanical gardens also maintain collections representing intraspecies diversity (varieties, cultivars), especially in selected ornamental plants. In fungi *ex situ* collections, only small part of existing species diversity is maintained (1 620 species) whereas existing *in situ* diversity in the Czech territory is not yet fully known. Intraspecies diversity of fungi (races of pathogens, yeasts etc.) is conserved only in some species important for industry and agriculture.

Fundamental task is to preserve species (and genotypes) for the future and maintain their economic, cultural and scientific value. In botanical gardens, zoos and most of fungal collections, the basic task is to preserve diversity of species. Different priorities are set in conservation of biodiversity of agricultural crops, forest trees and farm animals, where mainly intraspecies diversity is maintained (through different ecotypes, clones, cultivars, races, genetic lines, populations) and utilised in breeding, practice, and industry. Utilising this diversity is linked to major economic benefits reached primarily through new varieties, races, quality seed stock and seedlings, clones, etc. Possibilities for such effective direct or indirect (cultivation) use, accent the economic value and importance of access to genetic resources and benefit sharing, especially in agricultural crops and forest trees. However this does not diminish the importance of access to and use of genetic resources for non-commercial purposes.

B. SWOT ANALYSIS

The **analysis of strong and weak points and opportunities (SWOT)** reveals certain problems relating to the extent of

preserved species. For example, the gene pool of farm animals does not include a gene pool of game species, while the broad biodiversity of genetic resources (especially in botanical and zoological gardens) results in high technological demands and costs that do not allow a thorough study of intraspecies diversity. As concerns fungi, existing diversity in nature is only partially represented in Czech collections. In case of agricultural crops, the increase of collections is annually assured through collecting missions, exchange of genetic resources and acquisitions from domestic as well as foreign donors. Resources of local origin represent the main focus. Need of regeneration and conservation of genetic resources has not yet been satisfactorily resolved for plants and farm animals (the regeneration is to be completed in few years in agricultural crops, while conditions for regeneration in forest trees are not entirely completed and conservation technologies need to be improved in botanical gardens as well as in farm animals (cryo-preservation, equipment for seed conservation).

Access to genetic resources is well defined for collections of agricultural plant genetic resources; out of the total number of 48,8 thousand accessions conserved, 36,3 thousand are freely accessible (i.e. 74,4%), while another 9 thousand accessions (18,4%) are provided under certain conditions. Genetic resources of forest trees can be regarded as relatively easily accessible (especially services for domestic users, exchange of genetic resources with foreign partners is less common but possible), together with plant genetic resources from botanical gardens (exchange through *Index Seminum*) – however insufficient statistical data is available for either of these groups. Similar situation can be expected in fungi collections, where no common regulation is used and access of users is based mainly on a collaborative activities and /or mutual services. Free exchange of animals between zoological gardens is common and the Czech zoos are very active in this respect. Farm animals resources are available for national scientific and breeding purposes, providing resources abroad has not been resolved yet. Access of foreign users to genetic resources is based on a cost remittance or mutual reciprocity. The analysis showed that precise regulation and rules (which are satisfactory and available for genetic resources in agricultural crops, in a certain degree also in forest trees, fungi and farm animals, but are lacking in botanical gardens) significantly contributes to users access to genetic resources. In case of forest trees and farm animals certain problems may occur due to ownership relations (small forest owners, animal owners). Unfortunately, with the exception of zoo animals, systematic and effective health control of genetic resources is missing, or when existing, it functions insufficiently (only within the framework of general regulations). Restrictions may apply for plants in relation to phyto-quarantine regulations, but no precise data are available on such events. The risks of working with plant gene pools primarily include virus diseases (especially in species propagated in vegetative way) and seed borne diseases. Solution represents material healing and regeneration, but this is often very laborious and technologically demanding, requiring also effective control systems.

Users access to genetic resources may be restricted for various reasons. Among plants and animals in botanical and zoological gardens, also critically endangered species are included, that are internationally protected. Similarly, genetic resources are not accessible if their provision could inflict a threat to their genetic integrity – this applies to 5,7% accessions in crop collections, while in zoos it is 47% of species, which are also legally protected (data is not available for other groups). A small group of genetic resources (56 accessions) of agricultural crops are declared as a property of their originator and they are available by owners permission only. As the analysis showed, an important source of new materials for agricultural crop, fungi collections, botanical gardens and forest tree genetic resources represent local genetic resources, and for the first three groups, collecting missions. The international exchange of genetic resources is also very important – although there are some restrictions (legal protection, quarantine and phyto-sanitary regulations, an insufficient legal framework – e.g. for farm animals). In general, collaboration with local donors of genetic resources is regarded as good or very good, however certain insufficiency are also evident in this area (e.g. missing mechanism for transfer of valuable materials developed

Oyster mushroom (Pleurotus ostreatus) usually growing on the wood of broad-leaved trees is known for its medicinal properties.

in research projects to genetic resources collections, only limited capacities and technologies available for fungi collections and forest trees genetic resources, legislative problems exists in case of zoological gardens). A problem, not yet solved, is the conservation and access to patented material and genetically modified organisms. So far the Czech genetic collections do not contain this type of accessions.

A survey of the possibilities of **sharing benefits** arising from utilization of genetic resources showed some identical characteristics in various groups. International collaboration, mutual reciprocity of services and exchange of genetic resources are considered as relatively effective activities in all groups. Czech institutions participate in international programmes and projects (inputs "in kind"). Bilateral agreements are other frequent form of international cooperation in all analysed groups. On the other hand, genetic resources are scarcely represented in the Development Assistance Projects and other international assistance programmes and expert activities, with exception of zoological gardens and forest trees (expert activities developed).

Different conditions exist for providing access to genetic resources and sharing the benefits of their use. Even though that certain legal framework exists for all discussed groups at national level (perhaps with the exception of botanical gardens), only that for genetic resources of agricultural crops is considered entirely satisfactory. In this group functional national legislation, framework and methodology exist (Act 148/2003, Decree 458/2000, which serve as basis for the „National Programme on Conservation and Utilization of Plant Genetic Resources and Agro-Biodiversity", the „National Programme Methodology" and the „Model Material Transfer Agreement"). All these documents are in harmony with international commitments of the Czech Republic (CBD, International Treaty on Plant Genetic Resources for Food and Agriculture). Legal status of forest tree genetic resources can be evaluated as partially satisfactory, thanks to existing Act 149/2003, on reproductive materials of important forest tree species and artificial crossbreeds designed for forest renewal and forestation, Decree No. 29/2004 and No. 139/2004. In case of farm animal, the situation need to be improve significantly with the New Act 130/2006 on farm animal breeds replacing the Act 154/2000 and the corresponding Decree on farm animal genetic resources, which entered into force on January 1, 2006. Zoos activities are regulated by the special Act No. 162/2003. Problems with the exchange of genetic resources should be addressed through harmonization

Moja – the first young of gorilla (Gorilla g. gorilla) born in the Czech and Slovak Zoos (on December 13, 2005).

between the Act on Local Authorities/Municipalities and the Act on Zoos. Collections of botanical gardens and fungi collections, with exception of fungi important for agriculture and food processing which are covered by the Act 148/2003, are not treated by a special Act and their management, conservation and utilization is dependant on their founder. However, proposal to institutionalise these collections is considered, e.g. through the establishment of the institute of a "National Collection" as used in some European countries. The SWOT analysis also confirmed (with the exception of agricultural crops) the need to adopt new legislation, if not existing, or to amend the existing one. The absence of applicable international legislation is negatively perceived in relation to farm animals.

With the exception of botanical gardens (see previous paragraph), the current institutional framework (structure, capacities and status of institutes responsible for the conservation and utilization of genetic resources) is considered relatively satisfactory and appropriate. In case of agriculturally utilised genetic resources

(agricultural crops, forest trees, and farm animals) convenient institutional framework is provided by the National Programmes for individual groups, which guarantees financing and coordination, methodology and controls. As the advisory bodies for each of the aforementioned programmes serve relevant Boards/ Councils of specialists at the Ministry of Agriculture. Similarly a special Commission of Zoological Gardens was established at the Ministry of the Environment and Commission of Botanic Gardens is proposed within the Union of Botanic Gardens. Coordinating body exists also for the National Programme on Micro-organisms Important for Agriculture, where part of fungi collections is included. The Union of the Czech and Slovak Zoos and the recently established Union of Botanical Gardens represent also a certain institutional framework.

The analysis showed certain gaps in organisational structure (poor coordination of research projects on agriculturally utilised genetic resources, missing links with breeding associations of commercial breeds of farm animals). In case of zoological gardens, agricultural crops and forest trees effective participation in international cooperation network exist and international standards are respected. The manner of financing has been recognized as a weak point in all agriculturally utilised genetic resources. Common problem of all these National Programmes is insufficient valorisation of funds due to inflation and the form of providing funds (replace existing governmental subsidies provided for agriculture by direct budgeting). In general, there is a lack of funds for introduction of new technologies and for investment. Greater stability and guarantee of financing are needed as well for botanical and zoological gardens and fungi collections.

Personal and technical capacities were evaluated as sufficient in agricultural crop and farm animals, but only partially covers the needs in forest trees, as insufficient were evaluated in botanical and zoological gardens. On the other hand, access to modern technology is considered as less problematic (it is seen as satisfactory for zoological gardens and partially for other groups). This primarily relates to the possibility of implementing new, high investment technology, such as cryo-conservation, molecular techniques and other biotechnological procedures. Even if such possibility does not exist in certain institution, cooperation with other similar institution offers certain solution. Nevertheless, the SWOT analysis showed the need to improve certain technical facilities and introduce new technology at least at some institutions where they are currently lacking and needed, which requires investment.

Personal capacity analysis led to the same conclusions in all groups: Although experienced, qualified personnel is available now, it is extremely difficult to attract younger people (generation exchange), undoubtedly due to not attractive remuneration.

Collaboration with national users (with the exception of botanical gardens) as well as international users was positively evaluated. While botanical and zoological gardens consider the connection between science and research projects and routine work with genetic resources as satisfactory, this relation is evaluated as limited in case of agriculturally utilised resources, despite of the fact that just in this group such cooperation should bring practical benefits, increased value for users and better access to genetic resources.

Negatively, especially in agriculturally utilized genetic resources, was evaluated cooperation with universities and the level of education on genetic resources and biodiversity. Lack of education on related themes and poor cooperation of universities and institutions responsible for genetic resources and biodiversity is considered as serious gap in national activities. This weak point affects also public awareness on genetic resources, which should be increased mainly in agriculturally utilized gene pools. Better situation exists in botanical and zoological gardens with tradition of public oriented activities. Promotion and especially more intense joint activities with non-governmental organisations are needed in most groups of genetic resources.

C. IMPLEMENTATION OF THE BONN GUIDELINES

Within the Project implementation of the Bonn Guidelines was analysed in the main focused areas: agricultural crops, farm animals, forest tree species, botanic gardens (BG) and zoological gardens (ZOO), partly fungi. The result of the survey can be summarized as follows.

General measures

Frame

for implementation of ABS principals is done by national legislation in case of agricultural crops, partly in farm animals, forest trees and fungi. As to BG and ZOO the national frame is missing so far, but international principles are respected.

Terms – their definition and use

Basic terms are defined in national legislation (in areas where it exists) and in part within Glossary of the Czech Academy of Agricultural Sciences (under preparation). As to ZOO the terminology is based on this used in

The World Zoo and Aquarium Conservation Strategy (WAZA 2005, Czech translation 2005).

Goals for ABS support
are defined as to agricultural crops, farm animals, forest trees and partly fungi within the National Programmes launched and guaranteed by the Ministry of Agriculture. Goals are not satisfactorily so far defined as to BG and ZOO.
National frame and goals in general are in relation to international treaties and documents, namely Cartagena Protocol on Biosafety, legal documents of UPOV, international phytosanitary measures, IPEN – International Plant Exchange Network (BG) and corresponding Council of European Union Directives.

Roles and responsibilities in ABS

Competent National Authorities
CNAs and corresponding NFPs (contact persons) were nominated for agricultural crops (Research Institute for Crop Production), farm animals (Research Institute for Farm Animals Production) and forest trees (Forestry and Game Management Research Institute). On the basis of the Project outcomes nomination was done of the CNAs and corresponding NFPs for BG (in the framework of recently established Union of Botanic Gardens) and ZOO (Prague ZOO – centre for editing of the Czech and Slovak ZOO Yearbook, among others).

Responsibilities of users and providers
are legally defined in case of agricultural crops, farm animals and forest trees, not sufficiently as to fungi. In ZOO are indirectly done by existing national legislation and take into account existing international treaties. In BG international principles are respected, but they are not clearly defined at national level.
A model Material Transfer Agreement exists for agricultural crops and farm animals.

Participation of stakeholders

National Councils on Genetic Resources as consultative bodies were established at the Ministry of Agriculture with competency in agricultural crops, farm animals, forest trees and microorganisms utilized in agriculture. The Commission for Zoological Gardens at the Ministry of the Environment fulfils the similar function. No corresponding body has been established so far for BG but it will be solved in connection with establishment of the Union of the Czech Botanic Gardens.
In all monitored groups public awareness and information sharing activities have been relatively good developed (specialized publications, exhibitions, presentations for public etc.).

Steps in ABS process

Overall strategy
is defined for agricultural crops, farm animals and forest trees within the National Programmes, together with identification of steps (in different details). The Strategy is not so far sufficiently defined for ZOO and it is missing in case of BG.

Prior Informed Consent
System of PIC is not officially established at national level. Nevertheless some agreements and decrees at national level can be considered as contribution to such system. Principles of PIC are included in model MTAs for agricultural crops and farm animals. Principals are implemented in case of ZOO and BG on the basis of international treaties and rules, especially in international cooperation and exchange.
The outcomes of the BEA Project are aiming at support of these steps.

Benefit-sharing
Principles are in different forms and degree implemented in all monitored groups of genetic resources. International rules are respected as international cooperation is relatively well developed. Mechanism of benefit-sharing is not officially defined, most frequently it is based on mutual agreement or joint projects. Non-monetary benefits are mostly provided. Frequently it regards long-term benefits. Benefit-sharing is in most cases implemented through direct contact with recipient, in case of ZOO also through an intermediary (e.g. in ZOO within specialized programmes). Not so far fully used capacity exist in implementation of the Czech Development Assistance for less experienced countries.

Other provisions

Provided services (provided samples for national and foreign users, provided information or know-how) are *monitored* once a year, especially in agricultural crops. These data form part of Annual Reports for a given group of genetic resources.
Activities developed within the National Programmes (agricultural crops, farm animals, forest trees) are *controlled*.
In case of BG Index Seminum statistics is made.
In ZOO selling and purchase are recorded. Transfer of animals within EEP Programmes is registered by coordinator of corresponding Programme.
Rules of collections *ex situ* are done by national legislation (Act on Nature Conservation and Landscape Protection, Act on Genetic Resources for Food and Agriculture and corresponding decrees, methodology of National

Programme). During international expeditions the Code of Conduct (FAO) is implemented.
Sanctions are used in case of non-compliance with the National Programme. In agricultural crops the Act defines also remedies controlled by the Ministry of Agriculture.
In ZOO sanctions are applied in case of non-compliance with contractual agreement.
Settlement of disputes are done by national Acts and in case of agricultural crops and farm animals through MTAs.
In ZOO disputes are settled through EAZA.

D. OTHER ASPECTS

Biosafety issues (c) were not directly objective of the Projects, nevertheless a special study on Liability of Damage Related to Transboundary Movement of Living Modified Organisms was elaborated within the Project (see Chapter V – Publications and Studies).
Note: Biosafety activities coordinated by the Ministry of the Environment – Environmental Risks Department. Proposal on the UNEP CHM Project was elaborated in 2005 in cooperation with the BEA Project coordinator.

Preservation of biodiversity knowledge and innovation from **indigenous communities and traditional lifestyle (h)** are dealt within the programmes on conservation of old traditional landraces of agricultural crops and fruit trees, conservation of old farm animals breeds, programmes for horse breeds used in forestry, special training of carters and working horses, within the zoo international programme on Przevalski horse and various re-introduction programmes, or conservation of old Czech cultivars of decorative plants in botanical gardens.

Second National Report (i) – not applicable
Note: Third National Report was elaborated under auspices of the Ministry of the Environment – International Biodiversity Conservation Department and it is available at the CBD website: www.biodiv.org

CHM (j) – not applicable
Harmonization with the **NCSA project (k)**:
The coordinator of the BEA Project participated in the Biodiversity group of the NCSA Project charged by elaboration of the report on the Convention of Biological Diversity implementation analysis, evaluation and further measures proposal.

Revision of NBSAP - not applicable
Note: The Strategy on Biodiversity Conservation of the Czech Republic was elaborated under auspices of the Ministry of the Environment – International Biodiversity Conservation Department and approved by the Czech Government on May 25, 2005 through its Decision No. 620/2005.

Publications
List of publications and studies see Chapter V.

Botanic Gardens and Arboreta collections represent genetic resources of domestic as well as exotic species and cultivars.

Conclusions and Proposals

Surveys done within the Project confirm that valuable genetic resources exist in the Czech Republic. Nevertheless results show differences between individual observed groups as to character of genetic resources conserved, species and intraspecies variability and number of conserved plant and/or animals or fungi, institutional and legislation status, technical conditions, safety of conservation, evaluation and documentation, regeneration measures, skilled staff and funds available, as well as awareness of genetic resources importance. Common problems and measures needed to improve the current situation are summarized in the following paragraphs.

Status of genetic resources and their accessibility

- Enhance effectiveness in management and use of genetic resources collections.
- Better control and monitor collections health status.
- Ensure regeneration of genetic resources.
- Improve evaluation and characterization of genetic resources in collections through investment to and use of new technology (DNA methods, cryo-conservation, etc.).
- Develop systematic inventory and monitoring of genetic resources, with special attention to local breeds, landraces (farm animals, agricultural crop), clones and races.
- Enhance role of gene banks, repositories and collections in conservation and reproduction of endangered and valuable genetic resources (as to BG consider institutionalization of "National Collection").
- Intensify research and monitoring in nature protected areas.
- Amend national legislation in line with development in corresponding global conventions and European regulation.
- Develop research projects both at national level (coordination with related institutions and National Programme), as well as through participation in regional and international projects.
- Develop wider international cooperation and exchange of genetic resources, experience and information.
- Improve sectoral and central databases and registers, as well as their interlinks (genetic resources, projects, supportive programmes and funds, in Botanic Gardens digitalisation of data).
- Stabilize financial resources, guarantee valorisation due to inflation and appropriate form of providing funds.
- Promote information, education and awareness on genetic resources and their importance (school curricula, publications, workshops, media, communication between stakeholders, etc.).

Benefit Sharing of Genetic Resources

- Enhance reciprocal services both at national and international levels (esp. genetic resources samples, information and experience sharing).
- Extend "in kind" contribution (access to databases, conservation of genetic samples, lectures, courses, workshops and conferences, expertise).
- Intensify participation in international activities.
- Focus the Czech Republic Development Assistance to genetic resources, their conservation, access and benefit-sharing (so far very restricted).
- Consider extension of existing nomination of National Competent Authorities of the Czech Republic (to the CBD Secretariat) – newly proposed the Union of the Czech Botanical Gardens and Union of the Czech and Slovak Zoological Gardens / Prague ZOO.

Strategy for Mobilizing Funds

Funding regarding genetic resources and connected activities differs greatly not only between different described groups but also within these groups, depending on institutional status, supervising institution, governmental body etc. This regards especially Botanical and Zoological Gardens, but also some specialized collection e.g. for research (Academy of Sciences of the Czech Republic, Universities) etc. The Project results only confirm this situation.

Some steps and measures are proposed to change these discrepancies and enhance availability of funds:

- Establish central databases of genetic resources according to main thematic groups and their interlink.
- Establish national central register of funds distributed according to their recipients (which enables re-allocation if necessary).
- Enhance awareness of responsible bodies and officers on importance of genetic resources and need of their conservation and sustainable use.

- Enhance communication between different responsible bodies and institutions.
- Enhance education and public awareness in this respect.
- Intensify wise use of European funds for given purposes and enhance Czech competitiveness.
- Intensify global international cooperation and focused Development Assistance.

Trial plots with white mustard and phacelia

Buckwheat field trials

Workshops, Publications, References

WORKSHOPS

Workshop "Access of Users to Genetic Resources and Sharing of Benefits from their Utilization"
Assembly Hall of Research Institute on Crop Production, Prague-Ruzyně, June 15, 2005.
50 participants, Proceedings published.

Databases and Registration of Plant Collections
Agricultural University, Prague-Suchdol, September 9, 2005
Within the international Conference „Introduction and Plant Genetic Resources/Botanic Gardens in the New Millennium"
96 participants, Proceedings published.

***Workshop/Excursion to Arboretum** Hrubá Skála and its vicinity*
Sedmihorky, October 22, 2005
Within the international Conference "50 Years of Protected Landscape Area Czech Paradise"
90 participants, Guide through the Arboretum published.

***Working Workshop** on preliminary BEA Project results*
Research Institute on Crop Production, Prague-Ruzyně, October 25, 2005
8 participants (coordinators, experts)

Workshop "Protection of Plant and Animal Species in the Czech Republic, Access of Users to them and Biosafety Issues"
Scientific and Technical Society, Prague, November 4, 2005
45 participants (experts, teachers, public)

Workshop on Genetic Resources and ABS
Centre of Ecological Education SEVER, Horní Maršov, Giant Mountains,
December 8-9, 2005
25 participants (experts, local authorities, educators)

***Working Workshop** on Project outcomes*
Research Institute on Crop Production, Prague-Ruzyně, January 12, 2006
7 participants (coordinators and experts)

***International Workshop on IPEN** (International Plant Exchange Network – Botanic Gardens)*
Faculty of Gardening, Mendel Agricultural and Forestry University, Lednice na Moravě, January 27, 2006
Union of the Czech Republic Botanic Gardens and cooperators (including BEA Project)
29 participants

Final Workshop "Genetic Resources – their Conservation, Access and Benefit-sharing"
Scientific and Technical Society, Prague, February 28, 2006
Presentation of the Project results (Reports on main investigated sectors)
55 participants (experts, teachers, public)

Related Workshops
Agriculture
Workshop on the project "Access to Genetic Resources and Benefit -sharing, conservation and Sustainable Use of Biodiversity Important for Agriculture, Forestry and Research". Paper by Dotlačil L., Stehno Z., Faberová I.: Estimation of Needs of Capacity Building: Access to Genetic Resources and Benefit-sharing, Conservation and Sustainable Use of Biodiversity Important for Agriculture, Forestry and Research".
Hotel Relax, Rožnov pod Radhoštěm, November 24, 2004
40 participants, Proceedings published.

Methods for Better Management and Utilization of Crop Genetic Resources Collections
AGRITEC Šumperk, Ltd., September 20, 2005
35 participants, Proceedings in print.

Workshop "Current Problems in Plant Genetic Resources and International Collaboration". Paper by L. Dotlačil: " Results of the Project UNEP/GEF: Access and Benefit-sharing" – Agricultural Crops.
Hradec Králové, Hotel Amber Černigov, November 23, 2005
48 participants, Proceedings, print 2006.

Forestry
Sustainable Management in Forests and Landscape - from Conception to Implementation.

Faculty of Forestry and Woody Industry of the Mendel Agricultural and Forest University, Brno, March 9, 2005, 200 participants
Ameliorative and Stabilizing Trees - Benefit or Loss for Forestry Management ? Faculty of Forestry and Environment of the Czech University of Agriculture (Prague), Kostelec nad Černými lesy, June 2, 2005, 50 participants

Forest Tree Species Breeding and Improvement in the Czech Republic and Poland. Forestry and Game Management Research Institute, Jíloviště – Strnady, September 8, 2005, 15 participants

PUBLICATIONS AND STUDIES

(elaborated within the Project)

Publications

- Roudná M., Dotlačil L. (Editors) (2005): Workshop Proceedings – Access of Users to Genetic Resources and Benefit Sharing. Ministry of the Environment, Prague, 74 pp. (in Czech, English Summaries)
- Jiroušek T. et al. (2005): Zoological Gardens of the Czech Republic and their Contribution to Biodiversity Conservation. Ministry of the Environment, Prague (ISBN 80-7212-362-9), 52 pp. (in Czech, English Summary)
- Roudná M. (Ed.) (2006): Biodiversity Enabling Activities: Access to Genetic Resources and Benefit-sharing, Conservation and Sustainable Use of Biodiversity Important for Agriculture, Forestry and Research – Czech Republic. Report on the UNEP/GEF Project (2004 – 2005). Ministry of the Environment, Prague.
- Roudná M. et al. (2005/2006): Arboretum HRUBÁ SKÁLA (guide with plan). Ministry of the Environment and Administration of the Landscape Protected Area Czech Paradise.

Studies

- Tošovská E. (2004): Relation between Biodiversity Conservation and Trade-related Aspects of Intellectual Property Rights.
- Tošovská E. (2005): Legal Aspects of Access to Genetic Resources and their Benefit-sharing.
- Tošovská E. (2005): Liability of Damage Related to Transboundary Movement of Living Modified Organisms.

Manuscripts

- Genetic Resources – Access and Benefit-sharing (Principals and Status in the Czech Republic).
- Role of Botanical and Zoological Gardens in Conservation and Reintroduction of Endangered Species.
- Botanical Gardens of the Czech Republic and their Contribution to Biodiversity Conservation.
- Dictionary of Terms: Biodiversity and Genetic Resources, Access and Benefit-sharing; Biosafety and Biotechnology.
- Workshop Proceedings – Final Project Workshop, February 2006.

Case studies, background documents, expertise
elaborated by 36 experts participating in the Project and representing various, mainly research fields.

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- Feit U., Driesch von den M., Lobin W. (Eds.) (2005): Access and Benefit Sharing of Genetic Resources - Ways and means for facilitating biodiversity research and conservation while safeguarding ABS provisions. Federal Agency for Nature Conservation, Bonn, BfN-Skripten 163, 123 pp.
- Kate K. ten, Laird Sarah A.(1999): The Commercial Use of Biodiversity - Access to Genetic Resources and Benefit-Sharing. Earthscan Publications Ltd., London, 398 pp.
- McGown J. (2006): Out of Africa: Mysteries of Access and Benefit Sharing. Edmonds Institute in coop. with African centre for Biosafety, ISBN 1-930169-49-3, 42 pp.
- Roudná M. et al. (2004): Genetické zdroje rostlin a živočichů.(Genetic Resources of Plants and Animals.) Ministerstvo životního prostředí, 60 pp. (in Czech, English Summary)
- Roudná M. (2006): Přístup ke genetickým zdrojům a rozdělování přínosů z nich - Jednání pracovní skupiny Úmluvy o biologické rozmanitosti. (Access to Genetic Resources and Benefit Sharing – Meetings of the CBD Working Group.) Zpravodaj Ministerstva životního prostředí, 4, p. 26-27 (in Czech)
- Secretariat of the Convention on Biological Diversity (2005): Handbook of the Convention on Biological Diversity Including its Cartagena Protocol on Biosafety, 3rd Edition, Montreal, Canada (ISBN: 92-9225-011-6), 1493 pp.
- Twarog S., Kapoor P. (Eds.) (2004): Protecting and Promoting Traditional Knowledge: Systems, National Experiences and International Dimensions. United Nations Conference on trade and Development, New York and Geneva (ISSN 1812-7061), 400 pp.
- UNEP (2004): Access and benefit sharing as related to genetic resources (Article 15). UNEP/CBD/COP/7/L28. Secretariat of the Convention on Biological Diversity, Montreal, 18 pp.
- www.biodiv.org
- www.abs.eea.eu.int

Czech Paradise – First Protected Landscape Area of the Czech Republic

Photos: Research Institute of Crop Production, T. Mrhálková (ZOO Prague), A. Lepšová, M. Roudná

Milena Roudná (Ed.): Assessment of Capacity-building Needs: Access to Genetic Resources and Benefit-sharing, Conservation and Sustainable Use of Biodiversity Important for Agriculture, Forestry and Research – Czech Republic
Published by the Ministry of the Environment, Prague, 2006, ISBN 80-7212-436-6, 20 pp.

Inflorescence of Phacelia tanecetifolia