COUNTRY REPORT ON THE STATE OF PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE

SLOVAK REPUBLIC

SLOVAK AGRICULTURE RESEARCH CENTRE
RESEARCH INSTITUTE
OF PLANT PRODUCTION PIEŠŤANY

State of Plant Genetic Resources for Food and Agriculture in Slovak Republic

Second Slovak National Report
on Conservation and Sustainable Utilisation
of Plant Genetic Resources for Food and Agriculture

Piešťany ,2008

Note by FAO

This Country Report has been prepared by the national authorities in the context of the preparatory process for the Second Report on the State of World's Plant Genetic Resources for Food and Agriculture.

The Report is being made available by the Food and Agriculture Organization of the United Nations (FAO) as requested by the Commission on Genetic Resources for Food and Agriculture. However, the report is solely the responsibility of the national authorities. The information in this report has not been verified by FAO, and the opinions expressed do not necessarily represent the views or policy of FAO.

The designations employed and the presentation of material in this information product do not imply the expression of any opinion whatsoever on the part of FAO concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. The mention of specific companies or products of manufacturers, whether or not these have been patented, does not imply that these have been endorsed or recommended by FAO in preference to others of a similar nature that are not mentioned. The views expressed in this information product are those of the author(s) and do not necessarily reflect the views of FAO.

Edited by:
Slovak Agricultural Research Centre – Research Institute of Plant Production Piešťany
Bratislavská 122
921 68 Piešťany
Slovak Republic

National Committee for
The Preparation of the Second Slovak National Report
on Conservation and Sustainable Utilisation of Plant Genetic Resources
for Food and Agriculture

Chair:
Assoc. Prof. Ing. Daniela Benediková, PhD.
Head of Gene Bank of the SR, Coordinator of the National Program on Conservation of Plant Genetic Resources; SARC – Research institute of Plant Production Piešťany
Piešťany, Slovak Republic

Members:
Ing. Gabriela Antalíková
Ing. Michaela Benková, PhD.
Ing. Iveta Čičová
Ing. Jarmila Drobná, PhD.
Ing. Pavol Hauptvogel, PhD.
Ing. René Hauptvogel
Ing. Ľubomír Mendel, PhD.
RNDr. Mária Žáková, PhD.
Gene Bank of the Slovak Republic
SARC – Research institute of Plant Production Piešťany
Piešťany, Slovak Republic

ISBN 978-80-88872-89-4

CONTENTS

LIST OF ABBREVIATIONS AND ACRONYMS

AOSTA	Association of Seed Technologists and Analysts
CBD	Convention on Biological Diversity
CCTIA	Central Control and Testing Institute for Agriculture
e.g.	for example
EC	European Community
ECCDB	European Central Crops Database
ECPGR	European Cooperative Program for Plant Genetic Resources
EPGRIS	European Plant Genetic Resources Information Infrastructure
ESA	European Seed Association
etc.	et cetera
EU	European Union
EURISCO	European Search Catalogue
FAO	Food and Agriculture Organisation of the United Nations
GDP	Gross Domestic Product
GEF	Global Environment Facility
GENRES	Information System Genetic Resources
GRAPE GEN06	acronym project
ha	hectares
IPGRI	International Plant Genetic Resources Institute, by now Bioversity International
ISTA	International Seed Testing Association
MCPD	Multi-Crop Passport Descriptors
NATURA 2000	Network of protected sites of the European Union member states
NCSA	National Capacity Self - Assessment
NR SR	National Council of the Slovak Republic
OECD	Organization for Economic Cooperation and Development
PGR	Plant Genetic Resources
RIAFE	Research Institute of Agriculture and Food Economics
RIPP	Research Institute of Plant Production
SARC	Slovak Agriculture Research Centre
SAS	Slovak Academy of Science
SASTAB	Slovak Association of Seed Traders and Breeders
sMTA	Standard Material Transfer Agreement of the Treaty
SR	Slovak Republic
SSO	Statistical Office of the Slovak Republic
Treaty	International Treaty on Plant Genetic Resources for Food and Agriculture
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UPOV	International Union for the Protection of New Varieties of Plants
WSSD	World Summit on Sustainable Development

SUMMARY OF ACTIVITIES

The second Country Report of the Slovak Republic describes the state of plant genetic resources for food and agriculture (cereals, fodder crops, grasses, vegetables, fruit species, medicinal and aromatic plants, etc.). The Report records situation and changes in this field since 1996 till 2006. It has been created by the staff of the Gene Bank of Slovak Republic the Slovak Agricultural Research Centre (SARC) – Research Institute of Plant Production (RIPP) Piešťany. In this Report the existing national conceptions concerning conservation of biodiversity and plant genetic resources for food and agriculture have been taken into account. The most important change of national importance was establishment and opening of the Gene Bank in Slovak Republic, with its seat in Piešťany in 1996.

Regarding legislation, very important event was passing the Act of National Council of the Slovak Republic no. 215/2001 on Conservation of Plant Genetic Resources for Food and Agriculture, Regulation no. 283/2006. Novelization of the National Programme on Conservation of Plant Genetic Resources for Food and Agriculture was carried out in 5-year intervals in the studied period. The last National Programme has been approved by the Ministry of Agriculture for the years 2005 - 2009. Activities were coordinated and results of this Programme were implemented by the staff of SARC – RIPP Piešťany. Programme was financed by course of the Act no. 215/2001 Coll. from the budget of the Ministry of Agriculture SR.

Agrobiodiversity plays an important role in sustainable agriculture and food production. Conservation and utilisation of biodiversity is therefore a part of sustainable management of agricultural and natural ecosystems. *Ex situ* conservation of plant genetic resources in the Gene Bank in the form of seeds and in field collection has been ensured since 1996. Monitoring of seed viability and recovery of vegetative species in field collection are made regularly. Several plant species are conserved in laboratory conditions *in vitro*. Generally we can state that *in situ* and on-farm conservation within the plant genetic resources for food and agriculture in Slovakia is not in such an extent that we would need. One of the reasons is also historical development in our country.

At the international level the Slovak Republic started accession negotiations on International Treaty on Plant Genetic Resources for Food and Agriculture, which came in force in 2004. This legislative process has not been finished yet. The Slovak Republic as the FAO member state is included into the regional group Europe, sub-group transition countries – Central and Eastern Europe. To meet its tasks and liabilites, the SR created the Committee for Cooperation of SR with FAO. The Committee has a framework Program of Cooperation for individual years.

Further important international activities were carried out within the VIth and VIIth stages of the European Cooperative Programme for Plant Genetic Resources (ECPGR). Representatives of Slovakia work actively in the Working Groups Wheat, Barley, *Prunus*, *Malus*/*Pyrus*, Vegetable etc. Information on plant genetic resources has been provided to the European Catalogue for Plant Genetic Resources (EURISCO) and into the European Central Crop Databases (ECCDB).

Though the great success has been achieved within the last ten years, there are still problems which must be solved, especially the problem of financing the activities connected with plant genetic resources, stability of research centers, characterisation and proper utilisation of genetic resources in research programmes focused especially on climate changes.

INTRODUCTION TO THE COUNTRY AND ITS AGRICULTURAL SECTOR

The Slovak Republic is a modern European country situated directly in the heart of Central Europe. It is a typical inland country. Since 2004 Slovakia has been a member of EU. It is a developed agricultural country, with diverse natural conditions. Bigger part of the country is situated in a hilly area of western part of the Carpathian Arch in the Western Carpathian Mountains, creating a border of several important European watersheds. The area is 49 035 km^2, elevation is from 92 to 2 655 m above sea-level. Slovakia belongs to the mild climate zone, but climate is locally highly affected by elevation and type of relief. The mean annual temperature in lowlands is 9-10°C. With increasing elevation the temperature declines by 0.52°C per 100m. The mean annual temperature on the highest hills at the elevation above 2500 m is only -3.7°C. Number of inhabitants in Slovakia is 5 389 000, density 109 people per 1 km^2.

Geographical location in Central Europe and on the border of Carpathian Mountains and Pannonian lowland is conditioning the rich diversity of flora and fauna. In Slovakia, about 112 070 plant species (including sea grasses) have been described so far and more than 28 800 animal species, including invertebrata. Within the plant species the 92 endemits with a high species diversity and 161 non-original species of natural origin occur in specific conditions.

According to the data of Statistical Office of the Slovak Republic the national economy was growing more rapidly than the agricultural economy in 2006. The share of agriculture was lower in all indicators of national economy compared to 2005. The gross domestic product (GDP) in stable prices in agriculture has increased by 2.6%, but with a slighter dynamics than in national economy (8.3%), and this reduced its share by 0.23 of percentual point. The increase in GDP in agriculture was affected by a slower increase of interconsumption (0.6%) than that of gross production (6.7%). The tendencies of development of basic macroeconomic indicators in agriculture and economy of SR were reflected in interannual changes in the share of agriculture in the economy of SR. In 2006, agriculture declined interannualy its share in GDP, added value, interconsumption and gross fixed capital formation. Also employment in agriculture as well as the share of agriculture in the total employment in national economy has declined.

1. Development of production

The Slovak agriculture experienced complicated development after 1990, when the trade conditions have been changed and public subsidies dissappeared. In this period, agricultural production declined and was adapted to the given conditions of smaller trade as well as to the consumer structure. Since 1995 the level of production has been stabilized. In the years 2000 - 2003 agriculture production was strongly affected by climate conditions, especially by drought and by warm weather, which highly affected economic situation of farmers. In 2004, farmers got the first subsidiary direct payments according to the rules of common agricultural policy of EU. Efficiency and competitiveness of agricultural sector have increased.

2. Land use

Agricultural land covers 49.7% of the total area of the Slovak Republic (4 903 600 ha), forests cover 40.84%. Agricultural land is composed of arable land, meadows, pastures, gardens, vineyards, and orchards. The use of agricultural land in the studied period 1996-2006 was changing rapidly in connection with the new economic forms of its utilisation and ownership. Arable land, which is the basis for plant production in Slovakia, has the highest share (61.7%). On the arable land there are grown especially cereals (58%), fodder crops (19%) and industrial crops (15.8%).

3. Structure of farming

Former socialistic cooperatives and state farms have been transformed to private trade companies and share cooperatives. These legal entities have the main share in land management, cooperatives 49% of land, trade companies 37%. The rest of the land is managed by private farmers (12.4%). The average size of cooperatives is 1600 ha, and that of trade companies 930 ha.

4. Natural conditions

From the agricultural point of view Slovakia is divided to 5 production areas. Maize production area represents 51% of the total arable land, rape production area 23%, potato production area 15% and potato – oat production area 4%. Mountains production area represents only 7% from the total arable land. The most frequent type of soil is cambizem (18.9%), then rendzina (12.8%), fluvizem (12.6%), brown-soil (10.8%) and chernozem (8.7%).

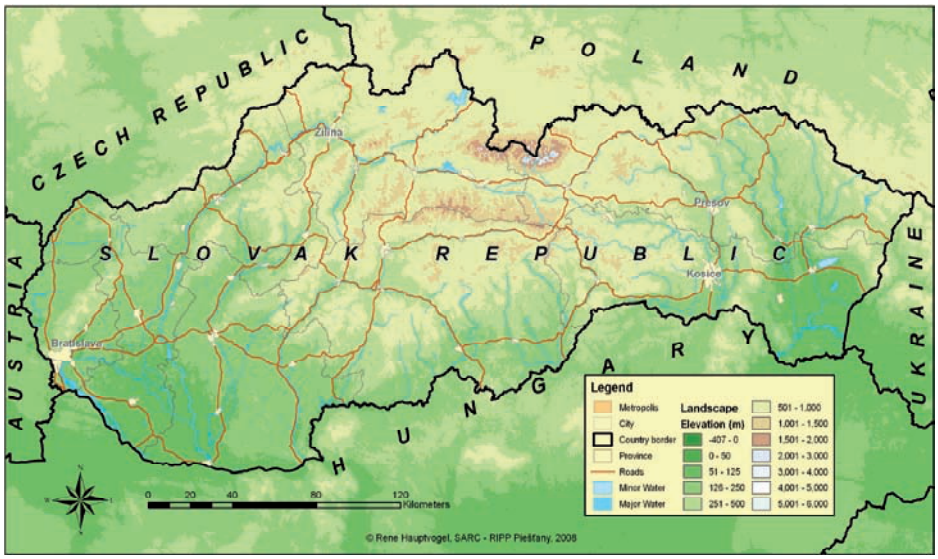
5. Main crops

Considering the area, the main crops in Slovakia are cereals, especially winter wheat grown on the acreage of 350 – 660 thousand ha, representing 26% of arable land. The second crop is spring barley, grown on 200 thousand ha in the average (14% of arable land). Maize is the third most important crop grown on 140 thousand ha (10.2%). Due to the enormous increase in the growing area of oilseed rape, the oil crops became the second most important group of crops with the acreage 200 thousand ha (7% of arable land). The share of root crops is declining. Sugar beet is grown on 32 thousand ha (2.3% of arable land). Potatoes, traditional crop in Slovakia in the past, with acreage e.g. 108 thousand ha in 1970, are grown now only on 26 thousand ha (1.9% of arable land). Legumes, represented especially by peas, are grown on the area of 18 thousand ha (1.3% of arable land).

6. Other crops

The acreage of annual fodder crops has been stabilized on 137 thousand ha (10% of arable land). The most frequent annual fodder is silage maize. Perennial fodder crops are also grown on 137 thousand ha (10% of arable land). Vegetables are grown on 12 - 14 thousand ha, vineyards, orchards and hop fields are not so important and their acreage has been stabilized on 30 thousand ha (1.5% of arable land).

FIGURE 1
Physical map of Slovak Republic



CHAPTER 1

THE STATE OF DIVERSITY

1.1 The state of diversity and relative importance of all major crops for food security

Industrialisation of agriculture in the past led in general to the loss of biological diversity in fields and pastures of Slovakia. Since 1996, proportion of all major crops like wheat, barley, potatoes, sugar beet in Slovakia has been changing.

According to the results of Structural Farm Survey, there were 8 977 registered commercial farms operating in Slovakia in 2006. The importance of all major crops for food security has been stabilized and can be seen it Table 1, expressed in harvest areas and hectare yields.

The size of area sown with agricultural commodities such as yarn plants, sugar beet, barley and wheat decreased again in 2006. In comparison with the year 1996 the share of particular crops has been changed. The increase in growing oil seed crops continued especially rape and sunflower growing. The continuing demand for oil seed crops in the domestic and foreign markets was connected with their processing for metylester production.

TABLE 1

Harvest areas of major crops

Crop	Harvest areas				Hectare yields			
	Unit of quantity	2004	2005	2006	Unit of quantity	2004	2005	2006
Cereals: total	'000 ha	815.5	794.6	732.9	t/ha	4.65	4.51	4.00
of which: wheat	'000 ha	367.8	373.0	349.1	t/ha	4.80	4.31	3.85
barley	'000 ha	222.0	204.2	184.5	t/ha	4.13	3.62	3.48
maize	'000 ha	147.8	154.1	151.0	t/ha	5.83	6.97	5.55
Sugar beet, industrial	'000 ha	35.5	33.2	27.7	t/ha	45.03	52.16	49.46
Potatoes	'000 ha	24.2	19.1	18.4	t/ha	15.76	15.77	14.31
Oil rape	'000 ha	91.5	106.2	122.5	t/ha	2.87	2.21	2.12
Sunflower	'000 ha	90.0	91.1	108.8	t/ha	2.18	2.14	2.10
Legumes	'000 ha	14.8	16.4	16 9	t/ha	2.54	2.13	1.94
Feeding plants	'000 ha	1.8	1.7	1.7	t/ha	31.23	39.04	28.97
Fruit*	Pcs	16 772.1	17 192.1	16 352.7				
Consumer vegetables	'000 ha	32.0	30.2	29.8	-	-	-	-
Must grapes	'000 ha	11.7	12.9	11.5	t/ha	4.77	4.17	4.47

Source: Final data on agricultural crops, fruits and vegetables in the Slovak Republic, SSO SR, 2004, 2005, 2006;
*trees and bushes
Prepared by: RIAFE

1.2 The state of diversity of crop varieties

Fruit orchards, vineyards and hop fields can be ranked among the special permanent crops. Permanent crop fields cover 21 403 ha: 9 272.56 ha fruit orchards, 330 ha hop fields and 11 800 ha vineyards.

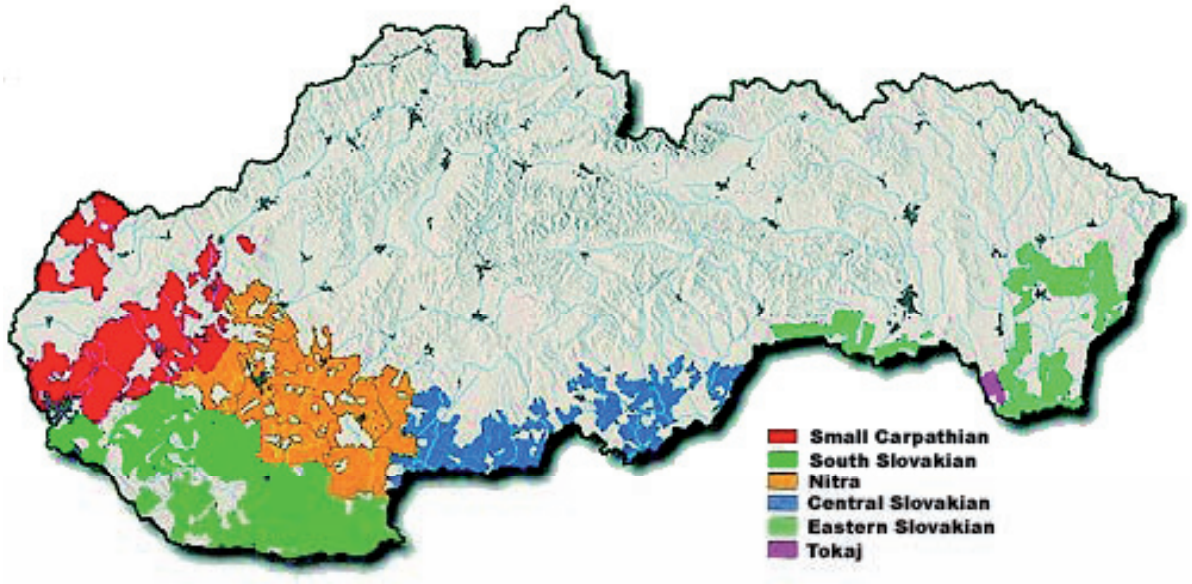
The total acreage of fruit orchards is 9 272. 56 ha, out of which 6 283. 52 ha are intensive orchards (32%) and 2 889.04 ha extensive orchards (68%). Two marketing organizations, associating 18 members, have been registered in the Slovak Republic. The main fruit species grown are apples (53. 6 % of total field), peaches (10. 2 %), and currant (7. 7 %). The most

grown apple varieties are Golden Delicious, Gala, Rubín, Idared, Jonagold, but also new varieties resistant to pathogens start to be grown.

The total area of hop fields is 330 ha and is created by 13 subjects with the fields from 10 to 60 ha.

Vine can be grown only in the warmest south-west, south and south-east regions of Slovakia. Depending on agro-ecological conditions, vineyard fields can be divided into 6 regions, where are 40 zones and 603 villages. The most frequently grown white varieties are Müller Thurgau, Welsch Riesling, Veltliner Green, Pinot Noir, Pinot Grey and Chardonnay. The most popular red varieties are Saint Lawrence, Frank Blue and Cabernet Sauvignon.

FIGURE 2
Viticultural regions in Slovak Republic



1.3 The state of diversity and relative importance of minor crops and under utilised species for food and agriculture

No official records about the minor crops and under utilised species for food and agriculture are in the Slovak Republic. There is only information from ecological agriculture, which is interested in growing these species.

Since the accession of SR to EU, the farmers´ interest in organic farming has been increasing. According to CCTIA, 265 farmers with organic farming system were registered in 2006. The land area of organic farms was 121 956 ha (5. 81% of the total area of agricultural land). Especially cereals, legumes, vegetables, fruits, medicinal and aromatic plants were cultivated on these farms.

1.4 The state of diversity of wild plants harvested for food production

Diversity of crop wild relatives in the Slovak Republic is organizationally managed by the Organization for Nature Preservation and Landscape and the Ministry of Environment SR. The organisation for Nature Preservation and Landscape studied and made a survey of the occurrence of particular terrestrial species. Regarding the situation in development of intensive agriculture in the past, for the monitored period 1996 – 2006 we have to state that only few species of wild relatives from Slovak flora can be used. No species are known to be used as typical species for food, maybe only some herbs can be included into this category. Some species are protected and registered in the National Red List. The Gene Bank SR registers 1 794 passport data of crop wild relatives. The 600 seed accessions of these are in the active collection, representing 4.2%.

1.5 The main factors affecting the state of diversity

Although adverse impacts on biological diversity may have different causes, in principle they are divided into natural ones (disasters, natural development) and those of human origin. This strategy addresses the second category including inter alia, pollution (heavy metals, phenols, dioxin etc.) inappropriate management practices, global climatic change, artificial introduction of alien species and uncontrolled release of genetically modified organisms.

The adaptation of agriculture to new conditions in the post-accession period (the formation of the Slovak Republic in 1993, entry to EU in 2004 year) called for formulation of new priorities in the agrarian and food policy: with the aim to increase the performance, productivity and competitiveness in a highly competitive environment within the EU Common Agricultural Policy. For this purpose the Development Concept for Farming Sector in 2007-2013 has been prepared. The Concept has defined the key strategic objective - to preserve fully functional rural areas, by maintaining agriculture under all production conditions of the Slovak Republic. To the extent justified by the ability to produce competitive products and the need for effective utilisation, protection, regeneration and permanent reproduction of natural resources, including preservation of cultural landscape and rural settlement.

Moreover, climate changes go off influence on plant production and impact the state of diversity by sudden change of weather and by appearance of rainfall, unevenly distributed during the year, extreme temperature etc. Therefore research and breeding companies began to use in their programs genetic resources maintained in the Gene Bank SR.

Change of fossil fuel price necessitated the change in the structure of cultivated species. There is a growth of oil species mainly oil rape at the expense of cereals and forages. Heavily decreased the fields of sugar beet and technical species (flax, hemp, potatoes), which were typical species for the country economy. Crop diversity was reduced due to the influence of highly intensive agriculture, due to formation of big plots of arable land, and some species of flora and fauna became endangered.

CHAPTER 2

THE STATE OF *IN SITU* MANAGEMENT

In situ conservation of biodiversity is a basic approach to biodiversity conservation and is traditionally connected with nature protection. At present, nature protection is regulated by the Act of the National Council of the Slovak Republic (NR SR) no. 543/2002 Coll. on Protection of Nature and Landscape. The Act regulates the agency of organs of state administration, as well as the rights and duties of legal and physical entities at protection of nature and landscape with the aim, "to contribute to the maintenance of diversity of conditions and forms of life in the Earth, to create conditions for sustainability, regeneration and rational utilisation of natural resources, preservation of natural heritage and characteristically look, and achievement and maintenance of ecological stability". Other instructions are Regulations of the Ministry of Environment SR, which declare particular protected areas and protected plant and animal species on the territory of the Slovak Republic.

The Ministry of Environment SR is the central organ of the state administration for nature protection. The main professional organization ensuring *in situ* conservation is the State Protection of Nature.

The problems of conservation and sustainable utilisation of genetic diversity, especially of economically, ecologically and culturally valuable genetic resources in agriculture and forest ecosystems, are managed by special enactments.

In situ conservation of agrobiodiversity components is ensured first of all at the level of registered varieties and hybrids of cultural crops in accordance with the Act no. 472/2002 Coll. as well as the Act no. 215/2001 Coll. on Conservation of Plant Genetic Resources for Food and Agriculture. *In situ* conservation is not sufficiently ensured at the level of landraces of cultural crop species. As a result, still more and more space is being created for extending genetic erosion and increased endangering of original genotypes of wide-spread plant species in Slovakia.

2.1 Plant genetic resources inventories and surveys

The components of biodiversity, which are important for biodiversity conservation and sustainable utilisation of its components, are identified by means of national legal instruments in the area of nature protection. The National Red Lists of valuable, rare and endangered species belong according to the Act of the National Council of the Slovak Republic (NR SR) no. 543/2002 Coll. on Protection of Nature and Landscape to the basic documents of nature and landscape protection. They represent an initial document of species protection, which is used for evaluating the degree of endangering and determination of protected plant and animal species. Also regional and local red lists have been worked out. They are an important source of information and give more details about endangered plant taxa from the nation-wide point of view.

The number of taxa protected by the state has increased to 1 368. Presently also species of European importance included into the *Habitats* Directive 92/43/EEC on Conservation of natural *habitats* and of wild *fauna* and *flora*, not occurring on the territory of Slovakia, are protected by our legislation. Of the total number of protected *taxa* the 850 *taxa* occur in Slovakia.

In Slovakia, even 38% of higher plants and 15% of lower plants are endangered. From the total number of 3 352 species of higher plants in Slovakia 1 270 species are registered in the Red list of ferns and flowering plants of the flora of Slovakia and 220 species are classified as endemits.

For critically endangered plants the programmes of rescue have been worked out. They contain basic data on a given taxon (biology, ecology, occurrence and distribution), basic reasons of endangering and also management measures for its rescue. Since 1997 to 2005 the rescue programmes for 42 plant species have been worked out.

The long-term monitoring of a good state of habitats and species is one of the objectives of the Strategy of building the system of protected areas NATURA 2000 in Slovakia. According to this Strategy, the monitoring methodology for 19 types of forest habitats, 47 types of non-forest habitats and 51 plant species including moss was developed in 2004.

The long-term monitoring of agrobiodiversity components is realized pursuant to the Act no. 215/2001 Coll. on Conservation of plant genetic resources for food and agriculture elaborated in the National Programme of Conservation of Plant Genetic Resources for Food and Agriculture managed by the Ministry of Agriculture SR. Activities in agrobiodiversity

monitoring are coordinated SARC – RIPP Piešťany. Also the Institute of Biodiversity Conservation and Biosafety, Slovak Agricultural University, Nitra participates actively in monitoring.

The task of national database, following from the Act no. 543/2002 Coll. on Protection of Nature and Landscape, is performed by the Information System of *Taxa* and Habitats – the database system for collecting and processing of botanical, zoological and habitats data, which is a part of the system of the National Protection of Nature of SR.

Monitoring and surveys are connected with collecting activities, aimed at mapping the occurrence of wild relatives, landraces and old varieties on-farms and in private gardens, using the Geographic Information System.

The aim of survey is identification of rare and endangered species belonging to plant genetic resources for food and agriculture, including cereals, legumes, forage crops, some vegetable species and fruit trees.

2.2 Conservation of wild plant genetic resources for food and agriculture in protected areas

Protection of nature and landscape is realized in accordance with the Act of the National Council of the Slovak Republic no. 543/2002 Coll. on Protection of Nature and Landscape. The Act defines the categories of protected areas for ensuring protection of habitats and plant species of national importance. The total acreage of specially protected areas in SR is 1 135 429.0958 ha, i.e. 23.16% of the territory of Slovakia.

TABLE 2
Protected areas in the Slovak Republic-Progress since 1997 till 2005

Category	1997			2005		
	Number	Total area (ha)	Area of arable land (ha)	Number	Total area (ha)	Area of arable land (ha
National Park	7	243 219	238 124	9	317 890	270 128
Protected Landscape Area	16	610 869	-	14	522 582	-
Protected Site	175	4 841.47	2 263.24	179	5 201	2 419
Nature Reserve	355	14 143.28	324.86	381	12 797	244
Private Nature Reserve	-			2	52	-
National Nature Reserve	229	82 121.89	3 162.24	219	83 712	2 810
Nature Monument	217	1 411.33	232.65	228	1 544	207
National Nature	45	55.31	26.62	60	59	660
Monument						
Total	**1 044**			**1 092**		

An important basis for development of science and presentation of nature protection is formed by biospheric reservations. Biospheric reservations are being established within the framework of the UNESCO Programme "Man and the Biosphere", whose aim is to protect plants and animals for present and future use, in their diversity and entirety, within the natural and seminatural ecosystems, to maintain genetic diversity of species and give possibilies for research in ecology and environmental science and for education. Within this Programme 4 protected areas in SR were accepted as biospheric reservations without legal regulation and qualification.

As an obligation resulting from the entry of SR to the EU the proposal of protected areas was prepared, according to the criteria determined by the legal decrees of EU, so called NATURA 2000.

The aim of the system NATURA 2000 is conservation of natural habitats and habitats of endangered plant and animal species at the European scale. The programme is built on strictly scientific principles. It goes out from the knowledge about the habitats distributions and habitats of species presented in supplements of given guidelines, for which special protected areas are determined on the basis of the strict criteria. In 2004, the National list of recommended areas of European importance was approved by the Government of SR. The list comprises 384 areas, whose total acreage is 576 569 ha, i.e. 11.7% of the territory of SR. Overlapping with the present network of protected areas is 10.2% from the territory of SR. Areas of European importance were recommended for 51 plant species and 66 types of biotopes.

Protected areas, being a rich reservoir of plant genetic resources, play an important role in conservation of biodiversity *in situ*. Despite this, excepting for some wood species (network of protected trees in 2005 was formed by 479 protected trees and their groups, including alleys), *in situ* conservation of plant genetic resources for food and agriculture is performed only as a nongoal-directed part of nature protection. Specific territories for *in situ* conservation of plant genetic resources for food and agriculture have not been established so far. Naturally occurring species of grasses, forage crops, medicinal and aromatic plants, are protected sufficiently in the existing protected areas.

2.3 On-farm management and improvement of the PGRFA

Landscape protection outside protected areas is based on the principle of the maintenance of territorial system of ecological stability ensuring diversity of conditions and forms of life in the country. The aim of determination of the area-wide system of stability in the country is maintenance and support of development of natural gene pool of the country, maintenance and completing of stabilizing elements in the country and ensuring their favourable influence on surrounding, ecologically less stable areas of the country, support of polyfunctional utilisation of the country, maintenance of important landscape phenomena. In spite of that many projects have been developed, documentation of territorial system of ecological stability was not successfully applied in practise.

The goal-directed conservation of plant genetic resources for food and agriculture, outside protected areas has not been ensured and realized sufficiently yet.

2.4 On-farm management and improvement of plant genetic resources for food and agriculture

In Slovakia, till the 50-ties of the last century, traditional varieties and landraces were grown on the farms and later they were collected and utilised in breeding. Due to collectivization in the 50-ties and then intensification of agricultural mass-production in the 80-ties and 90-ties, they were replaced by new modern varieties. This resulted in reduction of biodiversity of varieties of agricultural crops. At present, mostly the varieties originating from commercial breeding and seed production are being grown on-farms and in private gardens.

Within the framework of the tasks following from the National Programme, mapping the diversity and collecting the old varieties and landraces were conducted in various regions of Slovakia. Marginally it is still possible to find in Slovakia some field and garden crops, especially legumes, forage crops, vegetables and in a small extent also cereals. Collected materials are conserved in *ex situ* collections and documented in databases. On-farm conservation of old varieties and landraces is very sporadic also because of a high age of traditional farmers, declining number of people employed in agricultural sector, not sufficiently motivated young generation, insufficient seed production and legislation.

On-farm conservation is realized mostly in private gardens, it is especially growing and conservation of old varieties and landraces of some vegetable species, legumes, small fruit, medicinal and ornamental plant species. Seed production in these conditions is limited to the seed production for the own need. Conservation of valuable genotypes of vegetatively multiplied species, especially of old fruit trees is represented by repositoria at present.

On-farm conservation in our conditions is conditioned especially by the interest of farmers, support of research, economic and market conditions, well established seed production and by support of institutions and organizations involved. A higher interest in growing non-traditional or originally grown crops and varieties is shown mainly by ecological farmers and supporters of health lifestyle. One of the possibilities is to support and involve into the on-farm conservation small farmers and gardeners in the areas, where tradition of growing original crops and varieties has been preserved.

Independent research programmes and projects for this area have not been accepted and supported until now.

2.5 Assessment of major needs for *in situ* management of plant genetic resources for food and agriculture

For ensuring efficient and sufficiently effective *in situ* management of plant genetic resources for food and agriculture it is necessary:

- To strengthen existing capacities of institutions (financial, material and human resources) so as they would enable strengthening of *in situ* conservation
- To increase effectiveness of institutions in a public sector to perform *in situ* conservation
- To strengthen communication and improve coordination activities among the subjects concerned.
- To improve utilisation of subsidies for biodiversity conservation
- To create formal system and networks of concerned groups for *in situ* conservation of plant genetic resources for food and agriculture
- To make inventory and database of *in situ* conserved plant genetic resources for food and agriculture
- To improve public awareness in the field of biological diversity and value of wild relatives of cultural crops and landraces

For on-farm management it is necessary:

- To create conception for conservation of regional varieties endangered by genetic erosion
- To support research aimed at agronomic and genetic aspects and socio-economical analyses
- To ensure reintroduction of landraces to the farms and gardens
- To support young farmers to revitalize traditional agroecosystems
- To support seed production and ensure development of the trade with landrace seeds
- To ensure education of farmers in the field of utilisation and conservation of agrobiodiversity on the farms

CHAPTER 3

THE STATE OF *EX SITU* MANAGEMENT

Ex situ conservation is ensured by the Gene Bank of the Slovak Republic, built in 1996 as a specific facility for the long term conservation of plant genetic resources in full viability. Medium- and long-term conservation of plant genetic resources (PGR) is the main objective of the Gene Bank.

Conservation is made according to the National Programme of Plant Genetic Resources for Food and Agriculture in Slovakia and is supported by the Ministry of Agriculture SR. The mandate for coordination was given to the SARC-RIPP Piešťany. Under the coordination of RIPP another 18 co-solving workplaces from the whole Slovakia participate in PGR activities.

Till December 2006, the National Programme registered 181 collections and 32 910 accessions. Conservation of vegetatively propagated plant species is ensured in repositories with the acreage above 52 ha on the territory of Slovakia.

3.1 The state of collections

Ex situ collection

The Gene Bank of Slovak Republic during its existence has been conducting all activities resulting from its statute. Based on recommendations of curators, samples of plant genetic resources have been gradually stored in the Gene Bank. Plant genetic resources have been stored in two collections – base collection at the temperature -17 o C, active collection at the temperature + 4 °C. Since 1997 till 2006, altogether 13 963 plant genetic resources have been accepted to the active collection, 3 340 into the base collection and 2 852 into the safety collection. The following Table shows a review of the state of collections since 1997 to 2006.

TABLE 3

States of *ex situ* collections according to crops in individual years

Crops	1997	2000	2003	2006
Active collection				
Cereals	1 088	3 407	5 204	7 588
Vegetables	139	208	236	253
Food legumes	223	1 378	2 107	2 927
Oil plants	126	233	319	429
Fodder plants	0	562	739	839
Aromatic and medicinal plants	26	94	2	171
Sugar beet	51	52	108	114
Flowers	10	10	10	20
Grasses	1	61	93	117
Maize	31	231	535	820
Industrial plants	147	188	334	424
Other cereals	0	26	80	161
Total number of accessions	**1 842**	**6 450**	**9 767**	**13 863**
Base collection				
Cereals	26	620	752	1 067
Vegetables	54	121	132	133
Food legumes	131	569	779	961
Oil plants	136	136	195	207

Crops	1997	2000	2003	2006
Base collection				
Fodder plants	2	67	73	79
Aromatic and medical plants	9	23	28	42
Sugar beet	17	17	49	56
Flowers	26	61	61	61
Grasses	2	45	60	63
Maize	33	129	248	416
Industrial plants	146	148	239	239
Other cereals	0	11	16	16
Total number of accessions	**582**	**1 947**	**2 632**	**3 340**

Field collection

Field collections for vegetatively propagated plant species are an integral part of the Gene Bank of Slovak Republic. At present we register at the SARC – RIPP Piešťany in field collection 227 genotypes, out of which 101 are apricots (*Prunus armeniaca* L.) and 126 peaches (*Prunus persica* L.).

At the Research Institute of Fruit and Decorative Trees, Bojnice, field collection of 29 fruit species including 2 049 genetic resources is maintained on 21 ha. The biggest area is occupied by apple trees (*Malus domestica* BORKH.), pear (*Pyrus communis* L.), plum (*Prunus domestica* L.), cherry (*Cerasus avium* L.) and currant (*Ribes* L.).

Conservation of grapes (*Vitis vinifera* L.) is in a form of field collection in the Grapevine Company Modra. This field collection consists of 1 430 items.

In vitro collection

Two collections of National Programme namely 747 samples of potatoes (*Solanum tuberosum* L.) and 91 samples of hop (*Humulus lupulus* L), are conserved *in vitro*.

On-farm collection

Into the on-farm conservation, there we include 6 repositories situated on the territory of Slovakia on the area of 52 ha. The repositiories maintain especially apple trees (*Malus*), pears (*Pyrus*), plums (*Prunus*), vine (*Vitis*) and other fruit species.

3.2 Collecting

In the last 10 years collecting expeditions on the territory of Slovakia and other countries have been organized.

The planned collecting expeditions to certain localities were preferred and always more species were the subject of collecting using botanical and ethnographical information and previous collecting mission. Also a systematic collecting on selected territories of the Slovak Republic was realized, being aimed at preservation of indigenous landraces of grown crops, and their wild relatives. Accordingly collecting expeditions to the primary and secondary centres of diversity have been organized.

The main goal of the collecting expeditions is the reconnaissance of locations, searching, inventory of unique accessions of the traditional varieties and landraces as well as of ecotypes of the wild populations spread in various regions of the Slovak Republic and representing an important part of the natural resource of our country and cultural heritage of our people.

The territory of Slovakia is characterized by a high diversity. The originally grown landraces and populations have been collected and conserved for future generations, mainly genetic resources of horticultural plants in *ex situ* and *in situ* forms. Besides these species it is possible to collect also field crops, especially some pulses, fodder crops and in a small extent cereals in our territory.

The present state of lower occurrences of originally grown cultural species and landraces is especially due to the collectivisation and agricultural intensification in our territory during the last fifty years. In the fiftieth years many landraces of some species were collected, but original biological material has not been conserved. Collected landraces of grown species were used in the breeding of new varieties.

During collecting expeditions from 1996 till 2006 we have collected 6 566 samples including fodder crops and grasses, grain legumes, grasses, fruit crops, aromatical and medicinal plants, oil seeds crops, vegetables, cereals and wild relatives of cultural species (at Table 3.2).

Some local pulses, poppies and vegetables were collected regionally. The most important landraces were emmer (*Triticum diccocum*), collected in small regions of Biele Karpaty and chickpea (*Cicer arietinum*) in regions of Stiavnicke vrchy. The other valuable accessions were landraces of bean (*Phaseolus vulgaris* and P*haseolus coccineus*), which come from Povazie, Gemer, Turiec, Kysuce and Zahorie.

In course of sample collecting, we have also been studying the possibilities of utilisation of some sites for *in situ* conservation of plant genetic resources. For this purpose, mainly those meadows and meadow-orchards were chosen that had not been recultivated in the last thirty years and had been used in a classical way, i.e. cutting or farm animal grazing.

TABLE 4

Overview of collecting activities of SARC-RIPP Piešťany between 1996 – 2006

Year	Country	Acronym of collecting mission	Collecting area and Geographical regions (mountains, region)	Number of sample	Major collecting
1996	Slovak Republic	SVKPOV96	Malé Karpaty, Biele Karpaty, Žilinská kotlina, Strážovské vrchy	84	Multi-crop in Slovakia
1996	Slovak Republic	SVKPOL96	Poľana, Zvolenská kotlina, Krupinská planina	134	Multi-crop in Slovakia
1996	Ukraine and Slovak Republic	UKRKAR96	East Carpathian mountains – Lvovský, Ivano-Frankivsky and Zakarpatsky region, Východoslovenský kraj	600	Multi-crop in Ukraine and Slovakia
1997	Slovak Republic	SLOSPI97	Levočské vrchy	145	Grass and forage crops, vegetables, pulses
1997	Slovak Republic	SLOFAT97	Malá Fatra, Veľká Fatra, Žilinská kotlina, Turčianska kotlina	105	Grass and forage crops, pulses
1997	Slovak Republic	SLOKYS97	Javorníky, Kysuce	112	Pulses, vegetables, grasses
1997	Slovak Republic	SLOSIT97	Štiavnické vrchy	258	Fruit trees, pulses, vegetables, forage crops
1998	Ukraine	UKRKRY98	Crimea peninsula	302	Wild species - Poaceae
1998	Slovak Republic	SLOZAH98	Záhorská nížina, Malé Karpaty	132	Grasses, pulses
1998	Slovak Republic	SLOGEM98	Rimavsko-ipeľská brázda	310	Multi-crop in South Slovakia
1999	Slovak Republic	SVKCER99 SVKKER99	Čergov, Busov, Kremnické vrchy	222	Grasses, leguminous, oil crops
1999	Slovak Republic, Czech Republic and Poland	CZEBES99 SVKBES99 POLBES99	Moravskoslezske Beskydy, Javorníky, Orava, Beskid Zywiecki, Beskid Maly	820	Multi-crop in northern part Slovak Republic, Czech Republic and south Poland
1999	Poland	POLKIE99 POLNAR99	Kieleczyszna	103	Multi-crop in the Poland
2000	Slovak Republic	SVKBUR00 SVKPOV00	Burda Povazsky Inovec	8	Wild species
2000	Slovak Republic	SVKROH00	Roháče – Západné Tatry	248	Multi-crop in northern Slovakia
2000	Czech Republic	CZEPOD00	Podyjí	34	Forage crops
2000	Czech Republic	CZEJES00	Jeseníky	283	Grasses and forage crops
2001	Slovak Republic	SVKNTAT01	Nízke Tatry	338	Multi-crop in central Slovakia
2001	Czech Republic	CZEKRK01	Krkonoše	89	Grasses and forage crops

Year	Country	CZEMKRAS01	Collecting area and Geo-graphical regions (mountains, region)	Number of sample	Major collecting
2001	Czech Republic	CZEMKRAS01	Moravský kras	181	Multi-crop in Moravia
2001	Slovenia	SVNPIR01	Primorska	294	Multi-crop in Slovenia
2002	Slovak Republic	SVKGEM02	Slovenské Rudohorie (Gemer)	84	Multi-crop in south Slovakia
2002	Croatia (Slovenia)	HRVISTRA02	Istria peninsula	281	Multi-crop in Croatia
2003	Czech Republic	CZEPAL 2003	Pálava	239	Wild species in south Moravia
2004	Slovak Republic	SVKMUR 2004	Muránska planina	105	Wild species in central Slovakia
2004	Czech Republic	CZECESTR 2004	České stredohoří	156	Wild species in Czech Republic
2005	Slovak Republic	SVKPIEN05	Pieniny	111	Multi-crop in northern Slovakia
2005	Slovak Republic	SVKPODU05, SVKBUR05, SVKBKAR05	Podunajská nížina, Burda, Biele Karpaty	21	Wild species, forage crops and medicinal plants
2005	Czech Republic	CZEKRIV 2005	Křivoklátsko	151	Aromatically and medicinal plants, forage crops
2005	Hungary	HUNTAP05	Körös, Balaton Uplands and Bákony	55	Multi-crop in Hungary
2006	Slovak Republic	SVKSVN06	Štiavnické vrchy	79	Pulses and vegetable
2006	Slovak Republic	SVKBKAR06, SVKPOV06	Biele Karpaty, Považský Inovec	17	Aromatically and medicinal plants
2006	Slovak Republic	SVKHUN06	Podunajská nížina a Východoslovenská nížina	57	Multi-crop in southern Slovakia
2006	Armenia	ARMEN06	Provincie: Kotaik-Abuvian, Yerevan, Ararat, Vayots Dzor	56	Triticeae
2006	Hungary	HUNSVK06	Őrség, Bekéščaba	278	Multi-crop in Hungary
2006	Slovenia	SVNKOR2006	Koroška	74	Multi-crop in Slovenia

3.3 Types of collections

Genetic resources represent 181 collections with 32 910 accessions. *Ex situ* collection in the Gene Bank provide long-term conservation of seed samples of plant genetic resources in two collections, in the active collection and the base collection. From the base collection a duplicate, so called „safety collection" has been created. The biggest collection of seed samples is collection of cereals with 55%, represented especially by wheat, barley, oat and triticale. Then collection of pulses follows with 21%, consisting mainly of bean, soybean and chickpea. Fodder crops collection forms 6%. The rest is represented by minor crops, such as oil crops (3%), industrial crops (3%), medicinal and aromatic crops (1%), pseudocereals (1%) and beet (1%).

Field collections maintain vegetatively propagated species, such as fruit trees, bushes and vine.

In *in vitro* conditions potatoes (*Solanum tuberosum* L.) and hop (*Solanum tuberosum* L.) are conserved.

On-farm conservation includes 6 repositories with the area 52 ha in the whole Slovakia.

3.4 Storage facilities

The SARC-RIPP Piešťany as a coordinator of the„National Programme for Protection of Cultural Plant Gene Pool in Slovakia" ensures all the tasks and activities resulting from the Programme. Managing the activities with genetic resources in the Gene Bank of Slovak Republic consists of accepting samples on the basis of a passing protocol, so called „standard Material Transfer Agreement (s MTA), checking the passport data, registration of passport data in the receipt database, testing germinative capacity of samples, testing the humidity of accepted material, drying to the storage humidity 4

– 8%, preparation of data and forms, packing to the jars with silica gel and storage in collections (base, active). Seed samples in the Gene Bank are stored with the capacity of 50 000 samples in two collections – in the base collection at -17°C and in the active collection at +4°C.

In the base collection there is stored the most valuable gene pool, especially the seeds of native released varieties, old restricted varieties, landraces and populations, foreign varieties used for crossing and varieties having important characters suitable for breeding. The seeds in this collection are stored for 50 years and more, depending on the viability of the stored seed.

The seeds from the base collection are not intended for distribution, they are for future generations. Monitoring of germinability is made in 10-year intervals. Recommended size of sample for storage is 4 000 seeds for self-pollinated species and 12 000 seeds for cross-pollinated species. These quantities are not necessary for the rare species from collecting expeditions. From accessions stored in the base collection the safety collection (500 - 1000 seeds) is formed and stored in some other place, in our case in the Gene Bank Prague.

In the active collection, there are duplicate seed samples, which are also in the base collection and other plant genetic resources collected by curators of individual plant species. The seeds are stored at the temperature of 2°- 5 °C and the cycle of germinability monitoring is five years. Accessions stored in the active collection serve for distribution and regeneration. Regeneration of the seeds is ensured by curators of plant genetic resources. The seeds are stored in the active collection till they are all spent or till the decline of germinability.

In the cooling boxes of individual collections the dried seed samples with storage humidity 3 – 8% are stored in glass containers (720 ml, 360 ml, 210 ml) with silica gel and closed by a twist cap.

In herbarium there are stored dry parts of plants, especially spike collections of cereals at 10°C. They are used by curators of individual plants for mixtures checking.

In *in vitro* conditions are stored potatoes (*Solanum tuberosum* L.) and hop (*Humulus lupulus* L.)

3.4.1 Security of stored material

"Safety duplication" is an important part of the Gene Bank SR. It has been created from the base collection due to safety reasons, for the case of accident. It contains 500 – 1000 seeds of each sample. It is in the Gene Bank Prague, the Czech Republic. At present, this collection contains 2 852 accessions.

A guarantee of the safety of long-term stored seed samples in the Gene Bank of Slovak Republic in the base, active and safety-duplicate collections is following the standards of ISTA and AOSTA for storage, monitoring, and/or regeneration of samples in case of lower germinability. In this way conservation of plant genetic material is continually guaranteed.

3.5 Documentation and characterization

Documentation includes: receipt diary, basic document for passport database, field blotter with a plan of trials, document for descriptive database, basic meteorological data of respective year, laboratory recorder, analysis book, working diary.

Also other information related to the task is used: protocols and agreements on transfer of genetic resources (sMTA-standard Material Transfer Agreement) within the framework of national as well as foreign exchange.

In general, passport, characterization, evaluation and management of the data on plant genetic resources are in compliance with the international standards such as the "Multi-Crop Passport Descriptors (MCPD), which were jointly developed by the Bioversity International (formerly IPGRI) and FAO and published in December 2001 and also EURISCO descriptors (European Internet Search Catalogue). Standard descriptors for passport data are used by all national institutions. Software for gene bank management is in Visual FoxPro environment.

The documentation system holds passport data, characterization data, evaluation data, but also data about the distribution of the accessions, germinability and information about seed quantity and location. Characterization and primary evaluation is mostly carried out by curators. All participating institutions have an e-mail and Internet connection.

Databases of collections of the National Programme are an integral part of European databases ECCDB (European Central Crop Databases) and EURISCO. Establishment of European databases was initiated by individual working groups within ECPGR (European Cooperative Programme for Plant Genetic Resources). EURISCO is the European Internet catalogue of plant genetic resources, created and maintained at the secretariate of ECPGR.

3.6 Germplasm movement

During the 10 years of existence (1996 – 2006) of the Gene Bank of Slovak Republic a total of 6 216 seed samples of genetic resources from active collection has been provided to different users, out of which 5 819 samples were provided for research, 260 samples for breeding and 137 for schools and education. Altogether 205 samples from this amount were provided to foreign countries.

Since 1996 a total of 17 203 seed samples has been accepted for conservation in the Gene Bank SR, 13 863 into the active collection and 3 340 to the base collection.

TABLE 5
Release from active collection according to the crops in years

Crops	1997	2000	2003	2006
Cereals	1	154	672	4 012
Vegetables		2	104	228
Food legumes		46	107	372
Oil plants		0	51	312
Fodder plants		94	234	790
Aromatic and medical plants		0	6	58
Sugar beet		0	7	72
Flowers		0	16	35
Grasses	1	1	1	106
Maize		0	4	74
Industrial plants		10	41	112
Other cereals		0	9	45
Total	**2**	**307**	**1 252**	**6 216**

3.7 Roles of botanical gardens

In Slovakia, there are 15 botanical gardens and arboretums, 5 of them belong to universities, 2 to research institutes, 1 to museum and 6 to secondary schools. Also the Exposition of Tatra Nature, Tatranská Lomnica belongs to botanical gardens of protected areas. Priorities are: concentration of phyto-gene pool and formation of gene banks of endangered plants, especially indigenous endangered *taxa*, the study of biodiversity and submitting proposals for its protection; growing and multiplication of indigenous and introduced *taxa*; creation of the space for education and distribution of knowledge about plant kingdom among people with the aim educating to sustainable use of natural sources.

The best known botanical gardens are: Botanical Garden of Comenius University in Bratislava with the area of 7.5 ha and exposition of more than 5 000 species, especially exotic plants; Botanical Garden in Nitra with the area of 3,5 ha, that is a scientific and pedagogical workplace of the Slovak Agricultural University in Nitra, with exposition of 1 700 botanical species; Botanical Garden of the University P.J.Šafárika in Košice, with 30 ha and exposition almost of 4 000 plant species ranks among the most important in Central Europe; Botanical Garden Banská Štiavnica with 250 native and exotic wood plants on the area of 7.78 ha. The biggest arboretums are: "Arboretum Borová hora" on 29 ha with exposition of 1 100 taxa of wood plants, 590 rose varieties and 563 cactus *taxa* and "Arboretum Mlyňany SAS" with dendrologic collection including 2 500 *taxa* on the area of 67 ha.

3.8 Assessment of major *ex situ* needs

Ex situ conservation of plant genetic resources is getting priority attention at present. A unique and valuable diversity in gene banks and collections of plant genetic resources is aimed at endangered and suitable materials.

Basic priorities of National Programme of Protection of Cultural Plants Gene Pool in Slovakia for the period 2005 – 2009 are protection of cultural heritage and at present created values, expressed in plant genetic resources for food and agriculture (in conserved national and foreign varieties, lines, *taxa*, landraces) in favour of present and future

generations. An important priority is also contributing to the national development, food safety, sustainable agriculture and agrobiodiversity management by means of conservation and utilisation of plant genetic resources for food and agriculture. Other priorities of *ex situ* conservation are sustainability of existing *ex situ* collections, regeneration of endangered accessions of *ex situ* collections, support to the planned and goal-directed collecting of plant genetic resources for food and agriculure and extending the activities of *ex situ* conservation.

The paramount objective of *ex situ* conservation is increasing its effectiveness. For the seed collection in the Gene Bank of Slovak Republic this means the need to eliminate duplicates. This can be reached only by using molecular techniques and the data from these identifications must be available. Updated technologies for conservation of nontraditional plants propagated vegetatively; including *in vitro* - and cryo - preservation as well as improvement of databases and documentations are the strategies for strenghtening the national capacities for *ex situ* conservation.

CHAPTER 4

THE STATE OF USE

Effective utilisation of the gene pool assumes a perfect knowledge of existing genetic variability of species, biological characteristics of wide assortment of varieties and breeding semi-products. The basis is systematic searching, collecting, maintenance and study of genetically valuable varieties, ecotypes, landraces, half cultural forms and other genetic resources. Plant genetic resources and their conservation are economically and politically important strategic tasks of the state. They are an important part of the national property, because they directly effect the food safety of the country. Utilisation of genetic resources in practise is applied the most in cereals production, partly in fruit production and in the breeding of new varieties of medicinal and aromatic plants.

4.1 The importance of utilisation

Plant genetic resources are used in breeding programmes, in solving research tasks and in training programmes of secondary schools and universities, promotional and educational activities of museums and in permanently sown areas in some institutions. Plant breeding activities are carried out by private firms and joint stock companies, which are oriented especially on cereals, fodder crops, maize, potatoes, vegetables and partly also fruit species.

Within the framework of scientific and research activities the transfer of scientific knowledge to agricultural practise was ensured. In the studied period the national programme „Utilisation of domestic raw material and sources" was solved, where the solving of the task "Complex utilisation of raw plant material" has continued.

Research was realized within the programme "Ecologization and economic rationalization of primary plant production", research stage "Regulation of components of growing technologies of vine and fruit trees", substages : "Reproduction of initial material of fruit crops deprived of pathogens using *in vitro* techniques", "Making production of selected species of small fruits and less known fruit crops more effective".

Actual breeding objectives in fruit crops are: resistance or at least tolerance to the most severe diseases and pests, winter-hardiness and frost resistance, drought resistance (adaptability to changing environmental conditions), high production potential, lower requirements for growing technologies, attractiveness, look and flavour characteristics, suitability for storage and processing and other specific characteristics.

4.2 Utilisation activities and deployment of genetic diversity

In Slovakia, altogether 14 private breeding organizations are active at present. Their activities are focused at development of new genotypes, especially cereals (wheat, barley, rye), vegetables, vine and fruit species resistant to important pathogens, For these programs, genetic resources conserved in the National Programme, are a suitable source of genes resistant to pathogens and especially to the changing growing environment.

The breeding of less grown plant species is only marginal, aimed at extending the *spectrum* of the grown plants with some special forms of using, e.g. in health nutrition, as a source of energy, medicinal crops, etc. In the history of Slovak agriculture, composition of crops has been changing significantly, especially after introducing some new crops and due to the changing growing technologies and intensification of agricultural production, for which some original crops were not suitable and therefore have not been grown and bred any longer.

They are used first of all in ecological agriculture. From the field crops especially cereals are used, einkorn (*Triticum monococum*), emmer (*Triticum dicoccum*) and spelt (*Triticum spelta*) which is the only one grown on commercially important areas also now, then also millet and buckwheat. An important contribution of growing these crops is extending of the offer of quality production to consumer. It is necessary, however, to ensure together with the growing also processing and marketing of products, which often have character of regional specialities.

4.2.1 Seed supply systems and the role of markets

The seed production in Slovakia is managed by private seed producing companies and breeding stations. Control of their activities is carried out in cooperation with the Central Agricultural Control and Testing Institute (CCTIA), the state organization controlled directly by the Ministry of Agriculture SR. All activites in the field of seed production are carried out according to the Act no. 597/2006 Coll. These activities concern the seeds of field crops, vegetables, flowers, medicinal plants, tobacco, hop, fruits and vine. The aim of the state control is to prevent using the seeds and planting material ´with unsuitable seed and technological values.

The new bred varieties are registered in the List of Registered Varieties, issued annualy by CCTIA. Legal protection of varieties is provided by the Act no. 132/1989 Coll. on Protection of Rights of New Varieties and Animal Breeds in wording the Act no. 22/1996 Coll. Presented legal decrees provide legal protection not only to the seeds, but to all types of biological material obtained from variety, as the variety itself is protected legally.

Slovak Association of Seed Traders and Breeders – (SASTAB) acts in Slovakia, as a voluntary and non profit association. It unites 13 breeding and 23 seed producing subjects, which are the most important subjects on the seed market. The Association provides protection for breeders, seed producers and traders with seeds, planting material, nursery stock and other biological material from breeding, seed production, the trade with varieties, protection of varieties and development of breeding and seed producing activities. It is a member of European Seed Association – (ESA).

4.3 Utilisation of conserved plant genetic resources and major constraints to their use

Plant genetic resources are used mainly in research and in solved projects focused on extending specific diversity of meadow and pasture stands, extending minor crops, selection of suitable species and varieties for alternative utilisation of production, improvement of soil fertility, selecting and using some valuable landraces.

The number of available samples registered in passport database is 14 202. Users have at their disposal passport database and in cooperation with curator's also descriptive database of particular and evaluated genetic resources. Genetic resources are provided to users for free in compliance with International Treaty on Plant Genetic Resources for Food and Agriculture (FAO 2001) as well as in compliance with national legislation. Slovakia has prepared the standard Material Transfer Agreement. On the basis of this Agreement the samples of plant genetic resources are provided to users. In 2006, genetic resources were provided as follows:

TABLE 6
Provided samples of plant genetic resources

Samples provided in 2006	Breeding	Research	Abroad	Others
Cereals	127	513	50	26
Pulses	0	28	1	33
Fodder crops	0	3	14	5
Oil crops	0	4	0	0
Industrial crops	0	37	0	9
Medicinal crops	0	0	0	2
Stone fruit	127	585	65	75
Total	**254**	**1 170**	**130**	**150**

In the Gene Bank of Slovak Republic a total of 14 221 samples is stored. Approx. 80% of samples are available to users. Generatively conserved samples are more easily available as compared to vegetatively conserved samples. It is connected with the way of propagation and with health conditions of samples.

4.4 Assessment of needs to improve utilisation

- Development of strong National Programme of Conservation of Plant Genetic Resources for Food and Agriculture
- Development of strong international cooperation and participation of representatives from SR in important international events concerning conservation of plant genetic resources
- Operation of the Gene Bank of Slovak Republic
- Surveys and collecting expeditions in accordance with legal instructions valid in the Slovak Republic
- Obtaining more research projects.
- To provide more information and general knowledge for a laic public through the training programmes, exhibitions and various promotional events and presentations.

CHAPTER 5

THE STATE OF NATIONAL PROGRAMMES, TRAINING AND LEGISLATION

In accordance with the worldwide trend, systematic and purposeful conservation of plant gene pool, being one of the most important priorities of agricultural research, is carried out in Slovakia.

5.1 National Programme for Plant Genetic Resources

Activities concerning collections of plant genetic resources started in Slovakia in 1950. However, the first document for a systematic management of these activities was worked out by the staff of RIPP Piešťany and approved by the Ministry of Agriculture SR only in 1991. Its realization was in compliance with the decree of the Government SR, which approved the National Strategy of Biodiversity Conservation in Slovakia as our contribution to the Agreement on Protection of Biological Diversity, approved in 1992. In the next years, the National Programme was realized through the research tasks and tasks of professional assistance declared by the Ministry of Agriculture SR. National coordinator from RIPP Piešťany was entrusted with coordination of all tasks.

In 2004, the "National Programme of Conservation of Plant Genetic Resources for Food and Agriculture for the years 2005-2009" was prepared and approved. Structure of the document was worked out according to the Global Plan of Actions and was oriented to 20 priorities, divided to four areas: *in situ*, *ex situ*, utilisation of genetic resources and building of capacities.

The national Programme of Conservation of Plant Genetic Resources for Food and Agriculture has the following priorities:

- Protection of cultural heritage and at present created values expressed in plant genetic resources for food and agriculture (in conserved native and foreign varieties, lines, taxa, landraces, mutants, in favour of present and future generations)
- Contribution to national development, food safety, sustainable agriculture and agrobiodiversity management by means of conservation and utilisation of plant genetic resources for food and agriculture

The National Programme is realized by 18 holders of plant genetic resources. These are important private and national research institutes, breeding workplaces, non-profit organizations and private persons. National coordinator from the SARC – RIPP Piešťany, appointed by the Ministry of Agriculture SR, coordinates these activities.

Financing of the National Programme was ensured legally by the Ministry of Agriculture SR.

The Council for Plant Genetic Resources formed, by representatives from individual workplaces, works as a consultative body.

5.1.1 Information systems

Information system of the National Programme is developed in a form of databases and is in harmony with the international standards. The database of central register of plant genetic resources has been created at the SARC – RIPP Piešťany. A unique identification criterion of the genetic resource is so called "national registration number", allocated by curator to the genetic resource on the basis of given rules after including into the collection.

All collections of genetic samples have been documented and saved also electronically in a form of databases. Documentation is carried out by curators of the National Programme in compliance with methodical procedure for the data preparation and database creation.

The number of samples registered in the National Programme is 32 910. These represent all collections of 181 plant species for food and agriculture. The largest collections are collections of cereals, followed by fruit species, legumes and other collections lower than 6%. The Slovak Republic sends every year the database of passport data to the web

catalogue EURISCO. In 2006, the database with 15 029 accessions was sent to this catalogue.

Complex inventory is one of the basic methods how to obtain knowledges which can be used while working with genetic resources. There are several national and local monitoring programmes implemented in the Slovak Republic.

Many inventories of biological diversity are made at the level of species, communities, habitats and landscape.

A lot of institutions are engaged in collecting and monitoring data and information for the conservation of biodiversity and sustainable use of biological resources. The first database of strawberry collections on CD ROM and available on Internet was developed in the Slovak Agricultural University in Nitra in cooperation with the Iowa State University. The all collections of plant genetic resources are documented and computerized in a database.

5.2 Education and training

In Slovakia, education in the field of environment protection, agrobiodiversity and plant genetic resources is provided by secondary schools and universities controlled by the Ministry of Education SR.

At the Ministry of Environment SR, the Central Council for Environmental Education and Training has been established as an advisory and coordinating body of the Minister. The central organ for all types of schools is the Ministry of Education SR, which in relation with the Ministry of Environment should realize cooperation in education of children and youth in environmental care, creation of graduate profile and also the content of university environmental study.

Also the teaching plans "Environmental Education at Basic and Secondary Schools (Environmental minimum)" are supporting documents for education. The Ministry of Education SR has worked out the National Programme for Education and Training – Millenium, which considers the principles of sustainable development and creates a space for their implementation into the process of whole life education and training.

At the institutional level, especially at the universities, there are created sufficient professional capacities for educational process. Education in the field of conservation of agrobiodiversity, land and landscape, is provided by some faculties at Comenius University in Bratislava, Slovak Agricultural University in Nitra, Constantine the Philosopher University in Nitra, Technical University in Zvolen.

The number of compulsory subjects oriented at conservation and meaningful utilisation of biodiversity, agrobiodiversity and land protection at the faculties of natural sciences and agriculture is increasing. The faculties teach biodiversity, conservation and evaluation of genetic resources, management of gene banks, breeding, molecular biology etc. In the last years also more textbooks and teaching aids for the study of biodiversity, agrobiodiversity, biological safety and land conservation has been published.

Also the Slovak Agency of Environment participates actively in out-of-school environmental education and training, through its specialized workplaces and centres of environmental education in methodical management of the Centre of Environmental Education and Promotion. The Agency organizes methodical days of environmental education for pedagogues, provides advisory services for pedagogues and students and practical training in protection of environment and agrobiodiversity. It also realizes its own education programmes, especially within the whole life education for the staff in the state administration.

The Gene Bank of Slovak Republic organizes in two years intervals the scientific conference "Evaluation of Plant Genetic Resources" with approx. 100 Slovak and foreign participants (Czech, Poland, Hungary). Once a year an information bulletin "Gene pool" is published, presenting results of the National Programme. Also workshops and special "Days of field" are being organized. Here the results from evaluation of collections are presented in lectures and also excursions to the fields are made.

Within the framework of education activities organized by the Slovak Chamber of Agriculture and Food, also many training and education events for farmers involved in biodiversity conservation have been organized. The Slovak Association of Gardeners organizes regularly during the winter period the training for gardeners focused on conservation of old fruit varieties, less known vegetables etc.

5.3 National legislation

In accordance with intentions of the Government of SR in biodiversity conservation, namely its part concerning conservation of plant genetic resources for food and agriculture, the basic documents are:

- Announcement of the Ministry of Foreign Affairs of SR on conclusion of the Treaty on Biological Diversity published in Collection of laws no. 34/1996

- Decree of the Government of SR no. 231 of 1st April 1997 on acceptance of National Strategy of Biodiversity Protection in Slovakia
- The Act of National Council of SR no. 215/2001 Coll. on conservation of plant genetic resources for food and agriculture
- The Regulation of the Ministry of Agriculture no. 283/2006 Coll. to the Act on conservation of plant genetic resources
- Decree of the Government of SR no. 480 of 26th May 2004 to the proposal for accession to the International Treaty on Plant Genetic Resources for Food and Agriculture and proposal for concluding the Treaty on establishment of World Trustee Fund for Crop Diversity

Subsidiary documents of national legislation are:

- The Act of the National Council of SR no. 132/1989 Coll. on Protection of Rights to New Plant and Animal Varieties as amended by Act of the National Council of SR no. 22/1996 Coll.
- The Act no. 543/2002 Coll. on protection of nature and landscape and on the change and supplement of some acts as amended by Act no. 525/2003 Coll. and other acts
- The Act of National Council of SR no. 469/2003 Coll. on Designations of Origin and Geographical Indications of Products and on the change and supplement of some acts
- The Act of National Council of SR no. 78/2008 Coll. amending and supplementing the Act no. 184/2006 Coll. on growing genetically modified plants in agricultural production
- Regulation No. 318/2008 to the Act on growing genetically modified plants in agricultural production

But the most important act is the Act no. 215/2001 Coll. on Conservation of Plant Genetic Resources for Food and Agriculture, where the National Programme is defined as a summary of organization, legal and economic measures for ensuring the complex and systematic conservation of plant genetic resources for food and agriculture.

5.4 Public awareness

In the last years, Slovak public pays attention to the nature and landscape protection, where also conservation of biological diversity of species for food and agriculture belongs. In spite of accepted legislation it is necessary to inform constantly the laic public about the importance of protection of endangered plant species. Therefore one of the aims in the National Programme is the building of complex information system of plant genetic resources for food and agriculture, development of monitoring and warning system to prevent losses of genetic resources and support to the public awareness about the importance of conservation and utilisation of plant genetic resources.

5.5 Assessment of major needs for national programme development, training and legislation

Improvement of cooperation, between the sectors of agriculture and environment protection, which are responsible for a global protection of nature and landscape in Slovakia. Improvement of cooperation between the institutions involved in the National Programme and other potential holders of gene pools.

By course of the valid legislation, regular supply of finances for the centres involved in National programme, to secure conservation of plant genetic resources for food and agriculture.

Creation of non-governmental organizations, which would be more involved in conservation of selected plant species, because this type of organizations, taking care of biodiversity conservation, is not common, is Slovakia.

Development and financing of more projects oriented to education of wide public in biodiversity conservation.

CHAPTER 6

THE STATE OF REGIONAL AND INTERNATIONAL COLLABORATION

6.1 Regional and sub-regional networks, international crop-specific networks and subregional collaboration for maintaining *ex situ* collections

The Slovak Republic after its establishment in 1993 became a member of FAO. The SR is a member of FAO Commission on Genetic Resources.

Cooperation of the Slovak Republic with Bioversity International Rome, former IPGRI (International Plant Genetic Resources Institute) also started immediately after the establishment in 1993. The SR participates in the "European Cooperative Program for Plant Genetic Resources – ECPGR" coordinated by Bioversity International since its VIIth stage. This stage, which just finished in 2008, started in 2004. The Slovak Republic is involved in the activities of Working Groups and Thematic Networks and its activities are oriented to the priorities approved by the Steering Committee of ECPGR for respective stage.

For the VIIth stage it was especially concentration on:

- characterization and evaluation of plant genetic resources using molecular technologies such as molecular markers, genomics and bioinformatics
- development of cooperation, rationalization and specialization of activities with collections, creation of core collection, identification of the most original accessions with a maximum use of human and financial resources
- development of *in situ* and on-farm conservation, including analyses of material and development of techniques for conservation and management
- introduction, finishing, improvement and maintenance of documentation of national collections

The programme of cooperation of European countries – ECPGR –is aimed especially at the cooperation in *ex situ* and *in situ* conservation of genetic resources. ECPGR is formed by six crop Working Groups and three Thematic Networks. The Slovak Republic delegates actively its representatives to the meetings of Working Groups Avena, Barley, Wheat, Beta, *Malus*/Pyrus, *Prunus*, *Brassica*, Grain Legumes, medicinal and aromatic plants and to the network "Documentation and Information". The Slovak representative in the Working Group *Prunus* is a deputy of the head of the Group.

With regard to regional and sub-regional cooperation concerning plant genetic resources the following regional programmes are of particular importance: Council Regulations (EC) no. 1467/94 and no. 870/2004. The Council Regulation (EC) no. 1467/94 on the conservation, characterisation, collection and utilisation of genetic resources in agriculture established in 1994 a community programme on the *in situ*, on-farm and *ex situ* conservation, characterisation, collection and utilisation for improving the management of genetic resources for food and agriculture. Under this regulation also Slovakia participated in the GENRES projects. These were oriented mainly on cereals, fruit trees etc.

In order to support the maintenance of biological and genetic diversity further on, this regulation was followed by a second regulation for agricultural genetic resources EC no. 870/2004 establishing a common programme on the conservation, characterisation, collection and utilisation of genetic resources in agriculture, which was adopted by the Council of the European Union in 2004.

The Slovak Republic participates in the project coordinated by France, named GRAPE GEN 06 on conservation of genetic resources of *Vitis genus*.

6.2 International programmes

The Slovak Republic participates in the European Cooperative Programme on Plant Genetic Resources coordinated by Bioversity International and works actively in the Working Groups.

The Slovak Republic was participating in some international projects concerning the conservation of plant genetic resources within the 5th EU Framework Programme, EPGRIS and GENRES projects.

Project of the 5th EU Framework Programme: "European Crop Wild Relatives Diversity Assessment & Conservation Forum" - the project of multilateral cooperation (discussion forum on problem solution of *in situ* conservation, of wild and original genetic resources in Europe), solved under co-ordination of the University of Birmingham (Dr. Nigel Maxted), Great Britain.

EPGRIS Project "Establishment of European Plant Genetic Resources Information Infrastructure" - the project of multilateral cooperation solved under co-ordination of Bioversity International Rome, Italy and two projects, GENRES "Evaluation and Conservation of Barley Genetic Resources", the project of multilateral cooperation focused on evaluation and conservation of barley genetic resources and improvement of their accessibility for breeders in Europe under co-ordination of Gatersleben, Germany and "Utilisation of Plant Genetic Resources of Stone Fruits", the project of multilateral cooperation aimed at conservation of genetic resources of stone fruits in Slovakia, solved under co-ordination of Bioversity International Rome, Italy.

Bilateral International projects and agreements concerning plant genetic resources were aimed preferentially at the diversity mapping and collecting, wild and autochthonous plant genetic resources and landraces, non-traditional crops, use of methods of plant gene pool evaluation and conservation, utilisation and conservation of plant genetic resources and fodder research. In the period 1996-2006, a lot of collecting missions of plant genetic resources among the Slovak Republic and Czech Republic, Slovenia, Armenia, Poland and Hungary, in some regions of these countries was carried out (Note: More details in 3.2. Collecting expeditions).

6.3 International agreements

The Convention on Biological Diversity – (CBD) belongs to the most important international agreements concerning environment. It is an important milestone in the area of environment and development, because its approach to the conservation of Earth biodiversity and sustainable use of biological resources is for the first time complex, not sectoral.

The Convention accepts crucial fact that biodiversity and biological resources should be conserved because of ethic reasons, for economic contribution and survival of humans. The Government of SR agreed with accession to Convention on Biological Diversity in May 1993 and after ratification Slovakia became a contracting party of the Convention in November 1994. Notification of the Ministry of Foreign Affairs of SR about this was published in Collection of Laws no. 34/1996.

In 2000, a supplement to the Convention on Biological Diversity – the Protocol on Biosafety (Cartagena Protocol) was accepted and came into force on 11th September 2003. The aim of the Protocol is protection and safety in manipulation, utilisation and transfer of living modified organisms through the borders of the states. The Protocol came into force for the Slovak Republic on 22nd February 2004.

In May 1999, the UNDP and the Council of Global Environment Fund started so called Capacity Development Initiative. The results of this Initiative were the new opportunities of drawing finances from the Global Environment Fund for building national capacities. One of them is National Capacity Self – Assessment – NCSA. Based on this, in January 2004, the project "Identification of Priorities and Capacities Development to Meet the Duties of SR Resulting from Global Environmental Agreements" was approved for the Slovak Republic.

Republic would be able to meet requirements of Rio agreements. The Project has brought complete information about the existing capacities, about the needs of their strengthening, as well as about the areas, where the capacities are missing. The project contributes to better utilisation and allocation of financial, human as well as material resources.

The International Treaty on Plant Genetic Resources for Food and Agriculture was adopted on the 31st Conference of FAO in November 2001 and came into force on 29th June 2004. Its aim was the maintenance and sustainable utilisation of plant genetic resources for food and agriculture and equitable sharing the benefits arising from their use in accordance with the Convention on Biological Diversity for sustainable agriculture and food safety.

The Slovak Republic started accession negotiations concerning the Treaty in 2003. It has been supposed that the negotiations will finish at the beginning of 2006 by signing the Treaty. However, due to some legislative problems, we expect that the Slovak Republic will be ready to sign the International Treaty at the beginning of 2009. By signing this

document the Slovak Republic will undertake to respect conservation, study, collecting and evaluation of plant genetic resources and to exercise multilateral system to make the access to these resources easier and to share fairly and equitably the benefits arising out from their use. From this Treaty also other tasks will follow for the National Programme, especially regarding the activities of FAO Commission for plant genetic resources for food and agriculture.

6.4 Assessment of major needs to improve international collaboration

- The most important task, from which the other activities of Slovakia concerning plant genetic resources will follow, is the signing of the International Treaty
- It is necessary to involve the co-solving workplaces into the international projects in a bigger extent and to apply obtained results in native conditions.
- Within ECPGR to contribute to the Central European Database of particular crops
- To prepare programmes for improvement of public awareness on problems concerning plant genetic resources.

CHAPTER 7

ACCESS TO PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE AND SHARING OF BENEFITS ARISING OUT OF THEIR USE, AND FARMERS' RIGHTS

In the Slovak Republic, a complex policy regarding the access to genetic resources has not been developed. The Bonn Guidelines on the access to genetic resources, their ownership and equitable sharing of benefits give some directions in this area. It is necessary to apply them at the national level. Legislatively the issue is partially addressed through the Act no.15/2003 on the Conservation of Genetic Resources of Plants for Food and Agriculture. According to the Slovak law, regulations on access to plant genetic resources for food and agriculture and benefit sharing depend on by whom the plant genetic resources are held. No legal instrument currently covers intellectual property rights over the old cultivars and landraces. At the institutional level the responsibilities are not clearly defined.

Therefore a general access to plant genetic resources in private sector (*in situ* or *ex situ*) depends just on the owner. Plant genetic resources for food and agriculture in the public domain can be accessed according to the regulatory framework as described below.

7.1 Changes in the international legal and policy framework in relation to access and benefit sharing for genetic resources

The Convention on Biological Diversity is an important step forward in the field of environment and development, because for the first time, it takes a comprehensive rather then sectoral approach to the conservation of biodiversity and the sustainable use of biological resources.

The Slovak Government agreed with the CBD accession in May 1993 and following ratification, the Slovak Republic became a party to the CBD in November 1994.

In 1996, Slovak Republic hosted a preparatory meeting of the Regional Group for Central and Eastern Europe before the 3rd meeting of the Conference of the Parties. In May 1998, Slovakia was the host country of the 4th meeting of CBD COP.

At the EU level, the European Community Biodiversity Strategy was adopted in 1998. The Strategy covers 4 main strategic targets. Within the target 1 ("Conservation and sustainable use of biological diversity") countries of the European Community should find a common approach to conservation, and where necessary, to the restoration of ecosystems and species populations approaching their natural status and conditions.

In the target sub-area – "*In situ* conservation" the Strategy significantly deals with the network of special areas of conservation that are the part of NATURA 2000.

Conservation of biological diversity and renewable natural resources has a key place in environmental policy within the Organization for Economic Cooperation and Development (OECD). It is because that conservation of and trade in renewable resources, most notably biological, represent an important value for the global economy.

The CBD affirms the national sovereign rights of the States over their natural resources but calls at the same time on the countries of origin of genetic resources to grant a facilitated access to their genetic resources to other contracting parties.

Prerequisite and consequence of access to genetic resources is the fair and equitable sharing of benefits that arise from the utilisation of genetic resources.

An important achievement of the CBD process was the adoption of the Bonn guidelines on access to genetic resources and the fair and equitable sharing of the benefits arising from their utilisation, in 2002. The Slovak Republic supports the development of an international regime on access and benefit sharing as agreed at the WSSD 2002 at Johannesburg as well as COP 8 (CBD) as early as possible before 2010.

7.2 The state of access to plant genetic resources

The Slovak Republic, like most EU Member States, did not yet develop specific regulations on the access to genetic resources on its territory within the scope of the Convention on Biological Diversity. The Slovak Republic recognises private property and relevant legislation to plant genetic resources. Hence, depending on the location of a genetic resource within the sovereign territory of the Slovak Republic the regulation of access is governed by the Civil code, the Nature and Landscape Conservation Act. Thus in the Slovak Republic, anybody is allowed to collect plants growing *in situ* while respecting nature conservation, ownership and phytosanitary regulations.

Farmers have like breeders, scientists and others access to seed and propagating material from gene banks according to their needs, but most of the Slovak farmers use modern commercial varieties. Either they buy seed or part of the harvest is saved and reused as the seed or propagating material for the next harvest. Landraces are not grown on a large scale and only few accessions of landraces are conserved in the Gene Bank of for the main agricultural crops, small scale farmers are allowed to freely save and re-use the seed or propagating material from their harvests. All other farmers are also allowed to save and re-use the seed or propagating material from their harvest, but they have to pay royalties to the breeder of the respective variety; the amount due is depending on the proportion of saved and bought seed or propagating material. In general, seed supply is no problem in the Slovak Republic. The marketing of seed and propagation material of vegetables and a number of other agricultural products is subject to the Slovak Seed Trade Act, which in turn implements the corresponding EC Directives.

The Seed Trade Act of the European Union aims to ensure the supply of high-quality seed and propagating material. Only seeds that have been controlled, certified and authorised may be marketed. Variety Protection is granted on the basis of national laws (law No. 132/1989), in accordance with others laws.

7.3 Benefits arising out of the utilisation of plant genetic resources for food and agriculture

Benefits arising from the utilisation of plant genetic resources for food and agriculture with regard to the International Treaty include non-monetary benefits such as free access to material. These benefits can be shared fairly and equitably through the exchange of information, access to and transfer of technology and capacity building as well as through sharing the benefits arising from commercialisation. Furthermore, farmers as well as breeders, breeding research and breeding companies benefit indirectly from improved varieties which have been bred using *inter alia* plant genetic resources.

7.4 Financing plant genetic resources activities

According to the Slovak law, genetic resources are the property of the State. The State according § 22 of the Act no. 215/2001 Coll. provides financing of the National Programme and other activities with genetic resources.

7.5 Implementation of Farmers' Rights

The international legal instrument for the protection of varieties, the UPOV agreement, has been signed by the Slovak Republic as well as by 60 other countries.

Besides, the Treaty introduces the Farmers' Rights as recognition of the contribution of local and indigenous communities and farmers in the past, present and future. In the Slovak Republic, Farmers' Rights are realised as necessary. The responsibility for realising Farmers' Rights as they relate to plant genetic resources rests with the Slovak Republic. The opportunities of farmers to participate in decision making processes on conservation and use of plant genetic resources, in particular in pre-breeding and breeding activities are still limited.

REFERENCES

Benediková D. a kol. :Ochrana genofondu kultúrnych rastlín Slovenska a jeho zlepšovanie progresívnymi metódami. ZS RVT 27-11, Piešťany, December 2002, 128 s.

Benediková D. a kol.: Zhromažďovanie, hodnotenie a uchovávanie genetických zdrojov rastlín pre výživu a poľnohospodárstvo. ZS úlohy odbornej pomoci MP SR , SCPVVURV Piešťany, 2006,

Benediková D. *et al*. : Conservation of genetic resources of cultural plants of the Slovakia and their proceeding by progressive methods. Report of the project: RVT 27-11, Piešťany, December, 2002, 128 pp.

Benediková D. *et al*..: Collecting, evaluation and conservation plant genetic resources for food and agriculture. Report from task for MA SR, SARC-RIPP Piešťany, 2006.

Benediková D., Benková M., Hauptvogel P. *et al*.: National program for conservation plant genetic resources for food and agriculture in Slovak Republic, Report for MA SR, 2007.

Biologická diverzita. Identifikácia priorít a rozvoja kapacít na plnenie záväzkov SR, vyplývajúcich z globálnych environmentálnych dohovorov. Tematická hodnotiaca správa o potrebách rozvoja kapacít pre Dohovor o biologickej diverzite. MŽP SR, MP SR a UNDP/GEF, 2005, 65 s.

Report on Agriculture and Food Sector in the Slovak Republic 2007 (Green Report), Bratislava, December 2007 ISBN 978-80-89088-61-4

Správa o poľnohospodárstve a potravinárstve v Slovenskej republike 2007 (stav za rok 2006) „Zelená správa", Bratislava, 2007, ISBN 978-80-89088-56-0

Straka P., Guziová Z.: Národná stratégia ochrany biodiverzity na Slovensku (National Biodiversity Strategy of Slovakia). Ministerstvo životného prostredia SR, 1998, ISBN 80-88833-10-8

The Third National Report on the implementation of the Convention on Biological Diversity in the Slovak Republic, Bratislava, November 2005

Žofajová *et al*.: Country Report to the FAO International Technical Conference on Plant Genetic Resources (Správa pre FAO technickú konferenciu o stave genetických zdrojov rastlín v Slovenskej republike), Bratislava .1995

www.http://enviroportal.sk/dpsir

For further information please contact:
Gene Bank of the Slovak Republic
Slovak agricultural research centre
Research institute of Plant Production Piešťany
Bratislavska 122
921 68 Piestany
Slovak Republic
Tel.: ++42133-7722311; Fax: ++42133-7726306
Email: benedikova@vurv.sk
www.eucarpia.vurv.sk
www.vurv.sk