

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

HUNGARY





MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT

HUNGARY

**SECOND COUNTRY REPORT CONCERNING THE STATE OF PLANT
GENETIC RESOURCES FOR FOOD AND AGRICULTURE**

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INTRODUCTION TO THE COUNTRY¹

AND THE AGRICULTURAL SECTOR²

Hungary is located in South-East-Central Europe, in the Carpathian Basin surrounded by the Carpathians, the Alps and the Dinara Mountains, between northern latitudes of 45°44' and 48°35' and eastern longitudes of 16°07' and 22°54'. The territory of the country is 93 030 square kilometres, covering about 1 per cent of the European continent.

The total length of the borders of the country is 2 216.8 kilometres, of which 655.1 kilometres is the common border with Slovakia, 136.6 kilometres is shared with Ukraine, 448 kilometres with Romania, 621.1 kilometres with the successor states of Yugoslavia (165.8 kilometres with the Federal Republic of Yugoslavia, 355.3 km with Croatia and 100 km with Slovenia) and the border with Austria stretches on 356 kilometres.

Almost three quarters of the territory of the country are lowland, one fifth is hilly with a maximum altitude of 400 metres, and approximately 5% of the total territory of the country is mountainous, characterized by altitudes varying between 400 and 1 000 metres.

Hungary's highest peak is the Kékes Peak in the Mátra Hills, rising 1 014 metres above sea level. The lowest part of the country is located in the valley of the River Tisza, south of Szeged, in Gyálarét (78 metres). The Great Plain (Alföld) and the Small Plain (Kisalföld) are flat, the Zala, Somogy and Tolna counties in Transdanubia are hilly areas, while the mountains are represented by the Sopron, Kőszeg and Mecsek mountains in the Transdanubia and by the Northern mountainous region.

12.3% of the total territory of Hungary consists of meadows and pasturelands and a further 18.7% is covered by forests (primarily deciduous forests).

Approximately 2 200 plant and 45 000 animal species live in the territory of the country, the majority of which are native Central European species, but some Northern, Eastern and South European flora and fauna elements are also included.

535 plant and 855 animal species are protected. All caves within the territory of the country (altogether 3 600) are protected, and 125 of those subject to strict protection measures.

Among the protected flowering plants, the most unique species are the Mediterranean-type fragrant hellebore (*Helleborus odorus*) in the Mecsek Mountains; the wild peony (*Paeonia officinalis* var. *banatica*); the pheasant's eye (*Adonis vernalis*) and the nodding sage (*Salvia nutans*) on the Great Plain; the meadow anemone (*Pulsatilla pratensis* ssp. *hungarica*) in the Nyírség, and the dolomite flax (*Linum dolomiticum*) endemic to the Pilis Mountain.

To date nine national parks, 38 national landscape conservation districts, 142 national conservation areas, 1 natural monument (Aggtelek-Rudabánya-Szendrő core sections) and 1 125 regional conservation districts protected by local governments have been established in Hungary in order to safeguard the original habitat of the flora and fauna on a total area of 816 008 hectares.

Hungary is situated in the temperate zone, on the borderline of, and affected by three large climatic zones: the Atlantic, continental and Mediterranean. The country is prone to rhapsodic weather changes but due to the isolation of the Carpathian Basin by the surrounding mountains, it is relatively protected from sudden changes. Hungary's climate has a tendency for droughts, especially on the Great Plain, where the annual mean precipitation is below 500 mm.

The country's annual average mean temperature is 9.7°C. The mean temperature in the hottest month, July, is 20.0°C, and in the coldest month, January, -2.1°C. On a hot summer day temperatures may reach 33-38°C, while in cold winters temperature may drop to -25.0°C.

In the central part of the Great Plain the annual average rainfall varies between 470-550 mm, in the mountains between 700-800 mm. The number of hours of sunshine varies between 1 700-2 200 hours per year, the area between the rivers Danube and Tisza being the sunniest, while the regions with the least amount of sunshine are the Alpokalja (Lower Alps, Western Hungary) and the Northern Mountains. The annual average wind speed is 2.4 m/sec.

¹ Source: Magyarország.hu (<http://www.magyarorszag.hu/>)

² The Hungarian Agriculture and food industry in figures; Földművelésügyi és Vidékfejlesztési Minisztérium, 2007



1. Participants in the agricultural economy³

Hungarian agriculture is considered to be the most varied sector in the whole national economy (Figure 1). A special feature is the bi-polar economic structure, with both large farms and firms and smaller units. The number of middle-sized firms started to increase after the change of the economic regime. Although the number of farms has decreased during recent years, almost one third of Hungarian households have ties to agriculture or gardening.

According to their functions and production aims, there are farms that

- produce only for their own consumption (363 000 farms, 51.3%)
- trade with their surpluses (234 000 farms, 33.1%)
- produce mainly for the market (109 000 farms, 15.5%)
- provide agricultural services (707 farms, 0.1%)

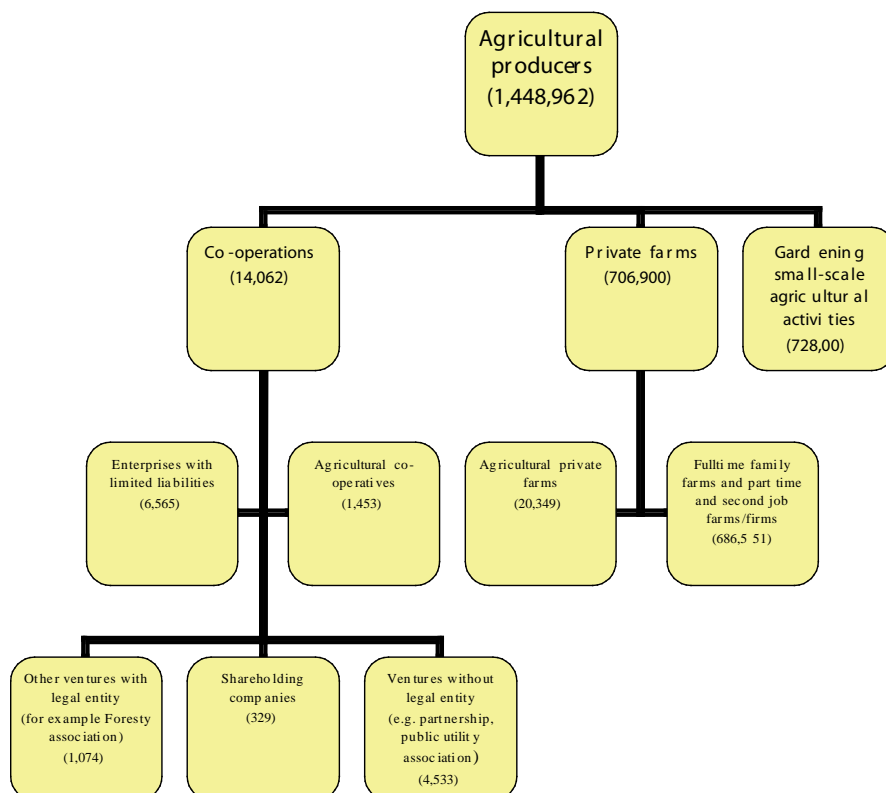
The importance of plant production has increased in Hungary over the last decade. According to the 2005 Farm Structure Register, almost three quarters of the enterprises grow plants. Forty-seven percent of the private farms only grow plants, while barely 20% deals with animal breeding and 25% deals with both types of activities. Twenty-six percent of the farms keeps animals, mainly cattle and pig.

Special mention should be made of organisations being set up for both production and sales activities. Subsidies are paid through these organisations under the EU market regulations on fruit and vegetables. Up to the beginning of 2005, one hundred co-operatives had been established, specialising in production and sales (TÉSZ). Their total sales revenue was about HUF 28 billion in 2006. The number of producers integrated into these organisations amounts to 21 000. To increase their competitiveness small-sized organisations have tended to expand in the past few years. Their activities account for 15% of sales of domestic fruit and vegetable production. Organisations of this type, specialising in both production and sales, have been formed in almost all the main fruit and vegetable growing areas of Hungary.

The state-owned forest area covers to 1 054 000 hectares, and there are 300 000 hectares of privately owned forest, managed by 27 000 persons.

FIGURE 1

Participants in the agricultural sector in 2005



³ The Hungarian Agriculture and food industry in figures; Földművelésügyi és Vidékfejlesztési Minisztérium, 2007

2. Characteristics of the Hungarian agriculture⁴

Agriculture is one of the most important sectors of the Hungarian national economy. The unique natural endowments, topography, climatic factors and the exceptionally fertile soils of the country make it potentially possible to achieve outstanding qualitative and quantitative results with most crops, as has been proved by the well-established agricultural traditions of the past millennium.

Apart from its favourable eco-geographical conditions, Hungary has the following additional advantages:

- a professionally educated labour force;
- the positive attitude of most Hungarian people towards agricultural activities;
- an advanced educational and research background;
- an institutional system for implementing official responsibilities.

Due to all these factors, Hungarian agriculture is traditionally export-oriented, and its excellent quality products can be found in almost all countries of the World. Changes in society during the 15 years since Hungary's change of political regime and economic system, and the restructuring of international markets have resulted in certain quantitative changes in Hungarian agriculture. At the beginning of the changes in 1989, agriculture produced 13.7% of the GDP, employed 17.4% of the labourers and produced 22.8% of export income. However, the relative significance of agriculture has decreased considerably during the years following the turn of the millennium. Today its share in the national GDP falls between 3.7 and 4.0% (Table 1).

TABLE 1
Share of agriculture in the national economy⁵

Year	Share of agriculture					Balance of external trade turnover ^{a)} , billion HUF
	In GDP-production	In consumption ^{a)}	In exports ^{a)}	In investment	In employment %	
At current prices, %						
1995	5.9	32.4	20.3	2.9	8.0	227.6
1998	4.9	30.3	10.5	3.6	7.5	314.8
2000	4.6	27.6	6.9	4.7	6.6	302.2
2002	4.0	27.0	6.8	5.5	6.2	308.9
2004	4.1	26.1	6.0	4.3	5.3	223.1
2005	3.7	25.1	5.8	4.5	5.0	181.1
2006	3.7	25.1	5.5	4.2	4.9	214.5

^{a)} Agricultural and food industry products; + Preliminary data

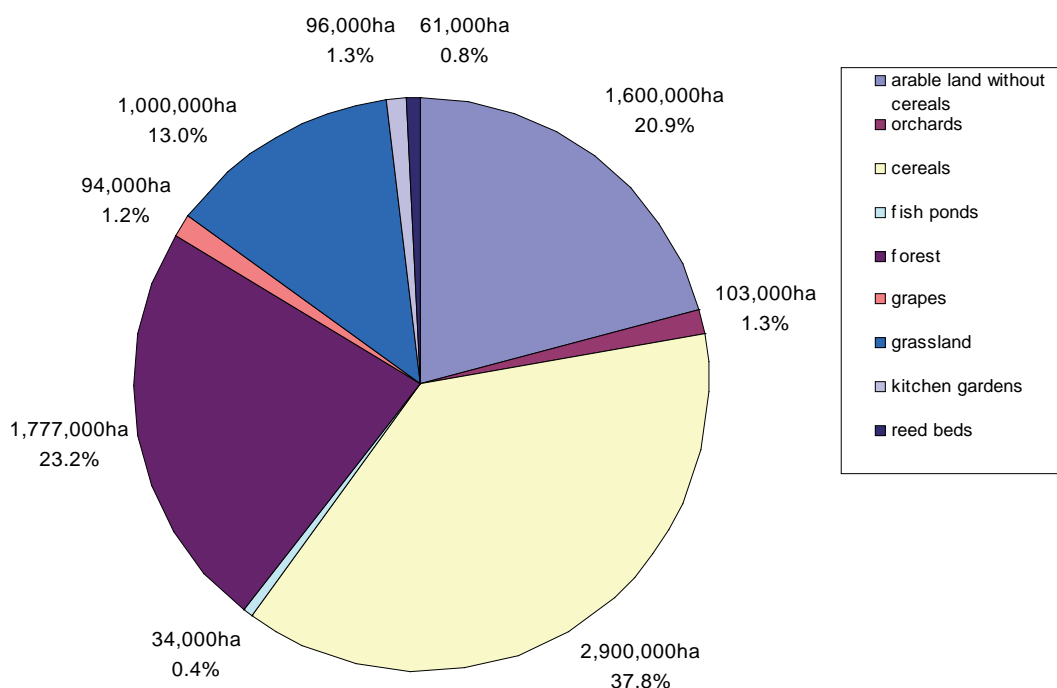
When evaluating the role of agriculture it should be emphasised that the 3.7% GDP rate of 2006 only reflects primary agricultural production. In Hungary, the rate of agribusiness (using the term agribusiness in a wide sense) is increasingly more important than indicated by its share in the primary production. According to the statistics, the rate of agribusiness's contribution to GDP production is around 12-13%.

Hungary has a total area of 9.3 million hectares. In 2006, the area of utilized land, including forests, reedbeds and fishponds, was 7 689 000 hectares. The agricultural land area is 5 817 000 hectares, which represents a uniquely high relative proportion in Europe. Seventy-eight percent of this area is arable land, and 17% is grassland. Kitchen gardens, orchards and vineyards accounted for 5% of the entire agricultural land area (Figure 2).

⁴ The Hungarian Agriculture and food industry in figures; Földművelésügyi és Vidékfejlesztési Minisztérium, 2007

⁵ Source: Hungarian Central Statistical Office

FIGURE 2
Shares of cultivated area by cultivation branches, 2006



In Hungary the political and economic changes from a centrally planned towards a market economy, involved radical changes of ownership, land use and operational methods. Today, private ownership dominates in the agricultural sector, which is a result of land compensation, proportional disbursement, the transformation of farmers' co-operatives and privatisation of state farms.

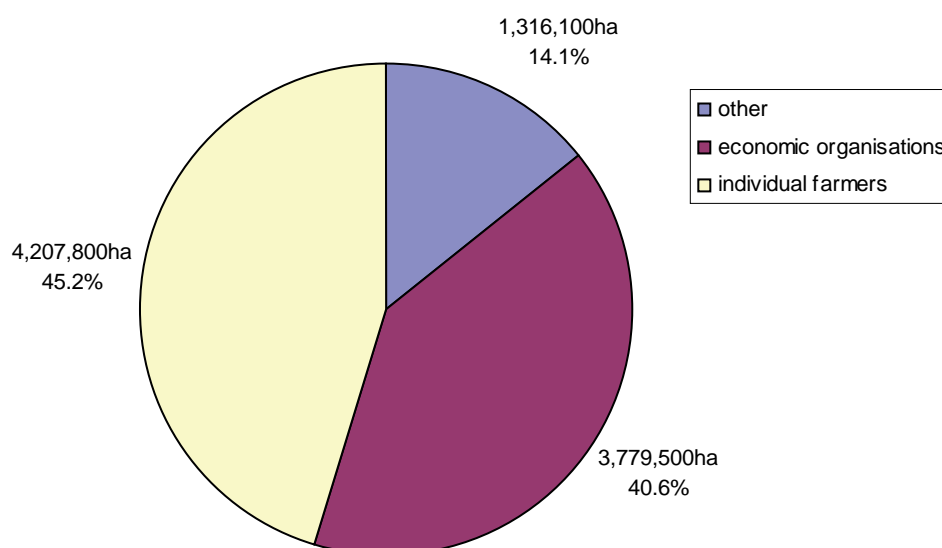
In land use, the role of agricultural individual farmers is still dominant. Their landholding slightly increased compared to the previous years, and individual farms cultivated almost 45% of the whole domestic land area, while 41% was used by agricultural enterprises. The remaining 14% are used for other non-agricultural purposes or consist of infertile areas (Figure 3).

In order to rationalise land use the government operates a National Land Fund. This institution has contributed to the improvement of the ownership structure and has helped socially disadvantaged people through the life-annuity programme, lump-sum purchases and sales, and public tenders for renting land.

The land market was characterised by slow development in the years preceding Hungary's EU accession, joined the European Union, and this was also characteristic of the period following the completion of the accession process. The demand has mainly increased for larger and unsectioned areas of lands and forests. The land market is characterised by moderate price increases and by significant increases in rental prices. The rental fees for better quality land represent 3-6% of land prices.



FIGURE 3

Land use by different organisation types in Hungary (thousand hectares)

There are considerable differences in the amount of labour used by agricultural production enterprises and individual farms. While the employees of the enterprises are mainly employed full-time (eight hours/day), working times are irregular - sometimes more, sometimes less - on individual farms. In both cases the trend in the use of labour in agriculture decreases each year. Using the annual labour unit of 1 800 working hours as a basis for calculation, agricultural production in 2006 used the labour equivalent to the annual work of a total of 512 000 workers.

However, even fewer people work full-time in agriculture. According to the 2006 labour market survey, the number of employees in the national economy was 3.9 million, of which agriculture, forestry and fishery employed 191 000 people, representing 4.9% of all employees in the national economy.

Gross accumulated fixed assets used directly or indirectly for agricultural activities amounted to HUF 174.9 billion in 2006, which is 93.1 % of the 2005 value at current prices. Agriculture represented 4.2% of total investment in the national economy. The proportion of investments in construction exceeded 30% of accumulated gross fixed assets. A considerable proportion of construction development was for extending the warehouse capacity, and within this category priority was given to cooling houses, greenhouses, fruit and vegetable stores, granaries, fodder mixers and dryers.

Among the major fields of agricultural techniques, a substantial deficiency can be seen in soil nutrient replacement, due to the dramatic decline of animal husbandry. In addition to already reduced environmental load levels, the moderate use of chemicals and organic manure is resulting in environmental loads falling below the EU average. Most of the agricultural technique indicators place economic enterprises in a good position (Table 2).

TABLE 2
Characteristics of agricultural technologies, 2006⁶

Description	Economic organisation	Individual farms	Total
Organic manure application (ha)	148 592	219 838	368 430
Share (%)	40.3	59.7	100
Share as a percentage of agricultural area	6.8	8.4	6.3
Organic manure per hectare of agricultural area (t/ha)	31.9	14.7	..
Irrigated area (ha)	59 167	19 026	78 193
Share (%)	75.7	24.3	100
Share as a percentage of agricultural area	2.7	0.7	1.3
Water used per hectare of irrigated area (m ³ /ha)	934	948	..
Artificial fertiliser application (ha)	1 581 544	1 294 542	2 876 086
Share (%)	55	45	100
Share as a percentage of agricultural area	72.3	49.9	49.4
Active ingredient of artificial fertiliser per hectare of agricultural area (kg/ha)	137.5

In 2006 the Ministry started to develop an advisory system, in line with European Community resolution 1782/2003. Groups of specialists were set up with the objective of changing the current system and formulating a new strategy. As a result of the preparatory work, the elements of the future advisory system were established:

- Area Advisory Centres;
- Regional Advisory Centres;
- Special Advisory Centres;
- The Ministry and the background institutions.

A modernised institutional system assists the government in undertaking its role. Paying agency duties are undertaken by an accredited budgetary organisation, the Agricultural and Rural Development Office.

The Central Agricultural Office (CAO) was established on 1 January 2007 by merging individual institutions and authorities. It inherited all the special tasks of its predecessors (animal hygiene; food safety; plant, soil, and agricultural environment protection; vine quality analysis; and operating the single record and identification system (ENAR) etc.).

Special consideration was given to the village management network system, which operates under the newly formed Central Agricultural Office. This network plays an important role in informing the farmers about the different conditions following EU accession, in preparing applications, and also in providing information to those in charge of the different units of the Agricultural sector.

In addition to the subsidies being received from the European Union the Hungarian government supports agriculture from its own national resources, a total of HUF 429.6 billion was paid for agricultural and rural development support in 2006, 35% of which came from national budgetary sources and 65% from the EU.

- Subsidies paid under the National Rural Development Programme (NRDP): HUF 65.9 billion (of which HUF 15.1 billion is the amount of national co-financing);
- SAPARD subsidies: HUF 9.2 billion (no national co-financing part in 2006);
- Subsidies paid under the Agricultural and Rural Development Operative Programme (ARDOP): HUF 51.8 billion (of which HUF 12.7 billion is the amount of national co-financing);
- EU-financed single area payment: (SAPS): HUF 93.5 billion;
- Market support paid directly by the EU: HUF 59.7 billion.

⁶ Source: Hungarian Central Statistical Office



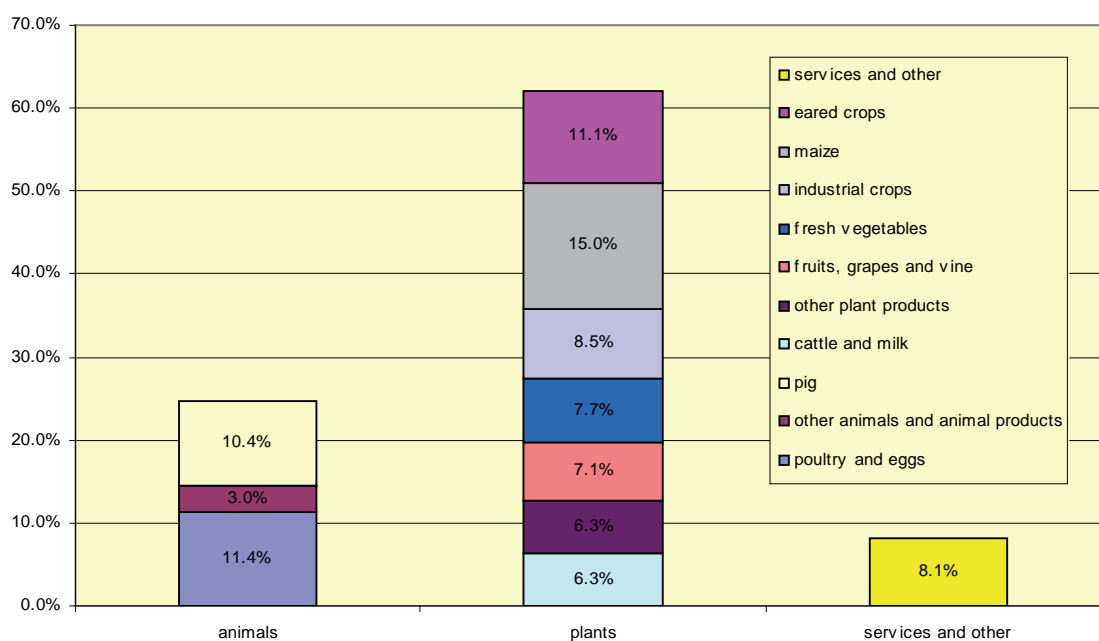
3. Achievements in the agricultural sector⁷

Total agricultural production in 2006 exceeded HUF 1600 billion, which was 6% more than the value of the previous year at current prices, but the volume was 3% lower. Although the quantity decreased, it can be stated that there were only three years (1991, 2004, 2005) in the last 15 years when agricultural output was higher than in 2006. During the last three years, the changes were determined by cereal yields, which decreased but still remained above average. (The highest yield was in 2004). The gross output of crop production increased by 48.8% in 2004 and by 13.2% in 2005, but decreased by 1.7% compared to the previous year (Figure 4).

The income conditions of the industry gradually improved after EU accession, and this trend continued in 2006. The output of the economic enterprises amounted to HUF 71 billion before taxation representing an increase of more than 50% compared to 2005.

FIGURE 4

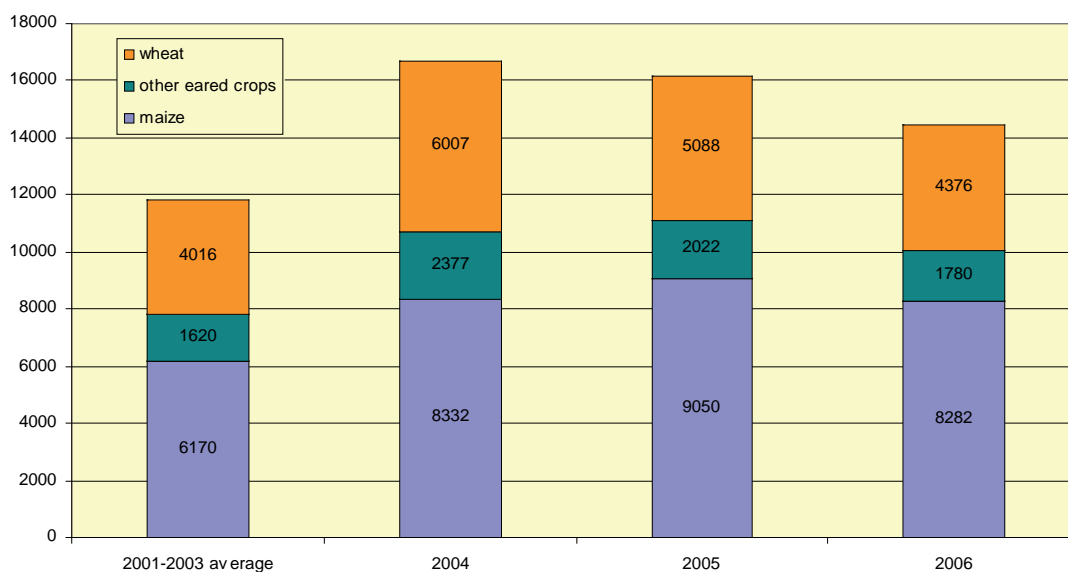
Gross output of agricultural products, 2006 (based on preliminary data current prices, % shares)



3.1 Crop cultivation

No significant changes have occurred in the structure of Hungarian crop cultivation in recent years. The proportion of cereals (wheat, autumn and spring barley, triticale, oats, rye and corn) dominates among the crops sown. During the last decade, adverse weather conditions and their side-effects severely affected the Hungarian agriculture. A series of droughts, floods, groundwater stresses, hailstorms and frosts in winter and early spring caused significant losses in crop yields (Figure 5).

FIGURE 5
Production of cereals (1 000 tons)



In 2006, 94% of the total area of usable arable land was sown with crops, while the unsown area increased by 86 000 hectares and amounted to 267 thousand hectares. The increase of the unsown area is connected to weather conditions. Compared with the data of 2004, the area share of cereals (wheat, barley) decreased, while the area sown with maize increased. The share of industrial crops increased, while that of legumes remained unchanged. The share of fodder crops did not change substantially, and silage maize and alfalfa remained the dominant forage crops.

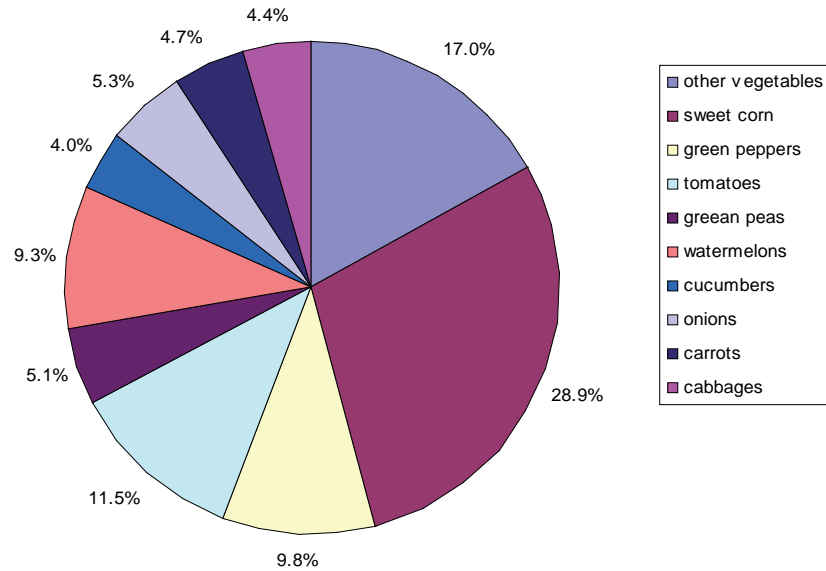
3.2 Horticulture

The climate and soil characteristics facilitate the production of numerous fruits, vegetables and grape varieties, and also that of medicinal, condimental and ornamental plants. These products are rich in flavour and aroma, and therefore meet the expectations of European customers.

Among the vegetables, sweetcorn was planted in the largest area and gave the highest yield, a total of 513 000 tons (Figure 6). On the area of 2 874 hectares devoted to growing tomatoes 205 000 tons were produced. The production of watermelons decreased (165 000 tons), but the production of green peppers (175 000 tons), red onions (95 000 tons) and cauliflowers (22 000 tons) exceeded the yields of the previous years.

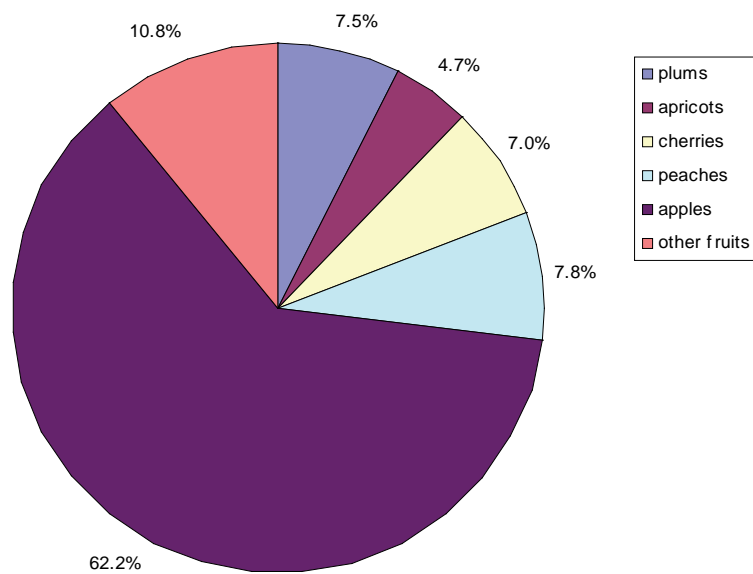


FIGURE 6
Shares of vegetables, 2006



In 2006, the total area of orchards decreased by 2 000 hectares, while the quantity of harvested fruit (863 000 tons) increased by 130 000 tons (Figure 7).

FIGURE 7
Shares of fruit production, 2006



The total grape-growing area in 2006 was 84 000 hectares, and the quantity harvested amounted to 550 000 tons, which exceeded production in 2005. Single-drawn wine production was 3.1 million hectolitre. In new plantations, resistant, locally bred varieties and dessert-grape vines were prioritised. The quality of the harvested grapes and of the wine produced was extremely good in three out of the last 10 years.

4. Hungary as a member of the European Union⁸

Hungary has been a Member State of the EU since 1 May 2004. The rural areas and the role of the agriculture are crucial for Hungary. The successful integration of Hungary's agrieconomic system into the Common Agricultural Policy and into the single market, as well as access to rural development resources have significantly influenced the Hungarian population's opinion concerning EU membership.

Facts that had been questioned by many people before accession have since become evident. These include that the Hungarian agri-economy has managed to integrate itself into the CAP framework - although not without some small difficulties - and the EU requirements have been assimilated and implemented. At the same time, as a member of the EU, Hungary has participated in debates on further agricultural development and in the development of new regulations.



⁸ The Hungarian Agriculture and food industry in figures; Földművelésügyi és Vidékfejlesztési Minisztérium, 2007

THE STATE OF DIVERSITY

Holdings in all institutions maintaining *ex situ* genetic resources collections (field crops, vegetables, fruits, grapes, medicinal and aromatic plants and micro organisms of relevance to agriculture) were assessed in 2003, in order to develop the National Inventory of PGRFA and to assist the supervision of collections funded within the state programme of Conservation and Improvement of the Biological Basis of Agriculture. The central funding mechanism was stopped after the accession of Hungary to the European Union in 2004, as some of its components did not comply with certain EU regulations.

In addition, a detailed survey was undertaken from 2000 to 2004 to assess the diversity of land races in three target areas (ecologically sensitive areas) with special reference to Phaseolus bean and maize. This project also included a socio-economic component and was conducted within the frame of the IPGRI's global programme "Strengthening the scientific base of *in situ* on-farm conservation of crop genetic resources".

The Plant Gene Bank Council has decided update the state of the *ex situ* collections in 2007. Negotiations have also started between the Ministry of Agriculture and Rural Development and the Ministry of Environment and Water in order to develop effective collaboration among stakeholders concerned in biodiversity issues, including the maintenance and utilization of agro biodiversity.

1.1 The Hungarian production system

Considerable changes occurred in the state of diversity of the country's Agricultural production system between 1996 and 2007 (Table 3). Comparing the relevant issues of the national list for cultivars published in 1996 and 2007 it turns out that in spite of a slight decrease of taxa the number of registered cultivars was almost doubled. In case of field crops, forest plants, fruits, grape vine the increases in the number of varieties are 110.8%, 35.7%, 76.6%, 91.8%, 72.1%, respectively. Although the number of taxa has slightly declined in the cases of ornamentals and vegetables, the number of registered varieties has increased in these crop groups as well. The change in case of vegetables is remarkable representing the highest increase among the crop groups (312%).

TABLE 3

Changes in the number of registered taxa and cultivars in Hungary

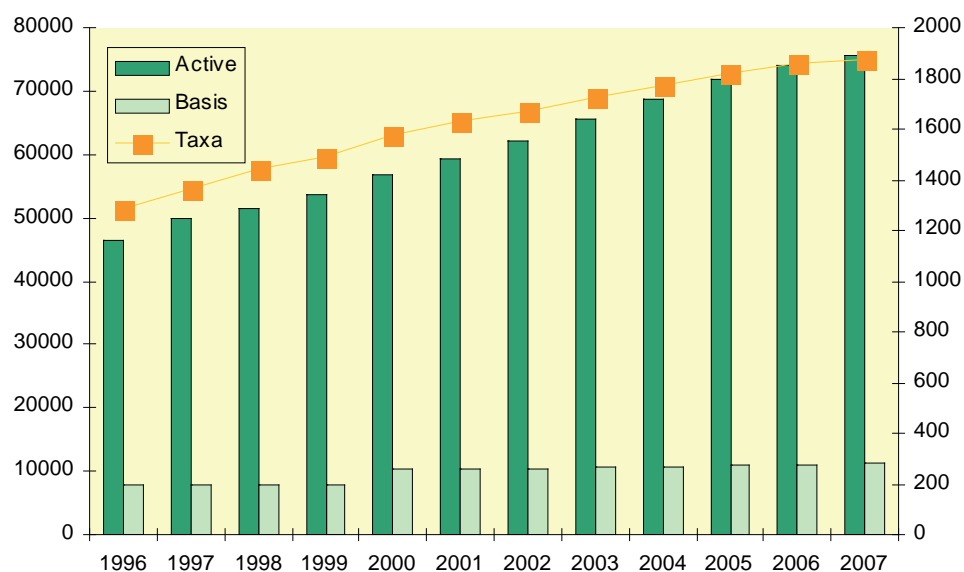
Crops	1996		2007	
	Taxa	Varieties	Taxa	Varieties
Field crops	73	761	85	1 604
Forest plants	11	28	11	38
Fruit	21	252	33	445
Grape vine	1	97	1	186
Medicinal plants, herbs, spice and volatile oil crops	28	43	36	74
Mushroom			7	12
Ornamentals	149	393	83	451
Vegetables	51	434	48	1 792
Total	334	2 008	304	4 602

1.2 The *ex situ* management

The collection of seed-propagated plant genetic resources contains 86 756 accessions of 1 877 taxa maintained under medium and long term chambers (Figure 8) at the RCA. The number of accessions in the Active collection increased from 46 489 to 75 598 between 1996 and 2007. The number of accessions in the Base collection (from 7 840 to 11 158) and the number of taxa (from 1 290 to 1 877) have increased, too.



FIGURE 8
Increase of taxa and accessions of seed-propagated species at RCA, 1996-2007



1.3 Crop wild relatives⁹

According to floristic literature, the Hungarian flora has a number of crop wild relatives (CWRs) and species with potential for food and agricultural production. The natural flora of Hungary consists of 2 161 vascular (angiosperm) taxa, including 60 endemic and 2 101 non-endemic species (Table 4).

Distribution of wild relatives by the associated crop groups is the followings: forage legumes (41 %) with 92 taxa, grasses (28 %) with 62 taxa, vegetables (12 %) with 27 taxa, pulses (8 %) with 18 taxa, oil and fibre crops (6 %) with 13 taxa and cereals (5 %) with 11 taxa (Figure 9).

The RCA has been conducting a survey to monitor the dynamics of population size of *Aegilops cylindrica* (a donor of the D genome of bread wheat) at several well documented habitats. A comparison of genetic variation observed in different years to characterize genetic changes has also started.

TABLE 4
The endemic species in Hungary

Endemism	No of taxa
Alpin-balkan endemic	1
Dacic-pannonic endemic	1
Dacic-subendemic	1
North-eastern pannonic endemic	1
Northern-carpathic endemic	1
Endemic	13
Eastern-alpin-carpathic endemic	1
Carpathic endemic	2
Carpathic-pannonic subendemic	2
Carpathic subendemic	3
Eastern-carpathic-pannonic endemic	1

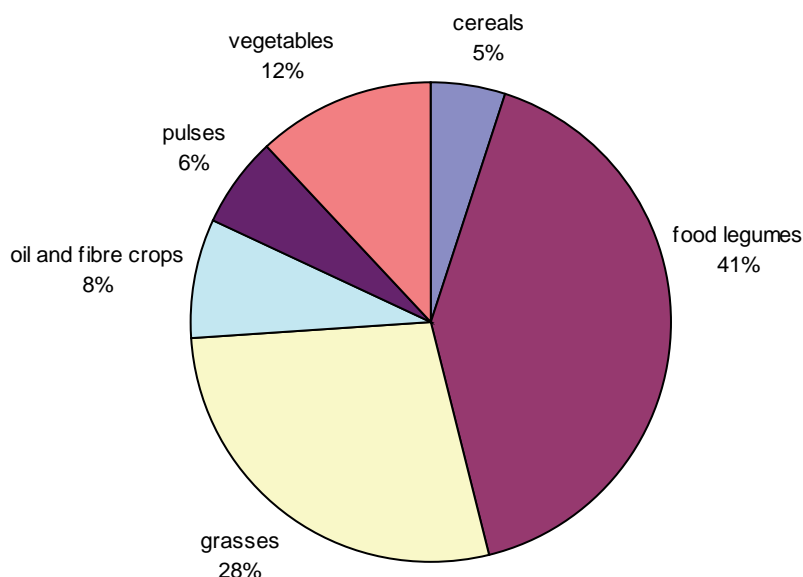
Endemism	No of taxa
Northern-carpathic-pannonic endemic	1
Western-carpathic-pannonic endemic	1
Pannonic-dacic endemic	1
Pannonic-northern-carpathic endemic	1
Pannonic-north-eastern carpathic endemic	1
Pannonic endemic	18
Pannonic-carpathic endemic	1
Pannonic subendemic	7
Pannonic-carpathic subendemic	1
Submediterranean-illiric subendemic	1
Total	60

⁹ G. Vörösváry, L. Holly and L. Horváth: Conservation priorities for crop wild relatives in Hungary; 2005

The objectives of genetic conservation of crop wild relatives include the designation of priorities and proper methodology for effective conservation and monitoring the distribution and diversity of selected CWRs in Hungary (Table 5).

FIGURE 9

Distribution of the main groups of crop wild relatives in the Hungarian flora



Collecting missions have focused on assessing samples from known and new habitats of rare and endangered crop wild relatives. It has been demonstrated that in the last decades certain natural populations of these taxa were severely affected by habitat disturbance and environmental stresses.

Six species (*Aegilops cylindrica*, *Apium repens*, *Linum dolomiticum*, *Medicago rigidula*, *Onobrychis arenaria*, *Trifolium subterraneum*) were selected for detailed studies. The major aims of this study were to identify, collect and evaluate the occurrence and genetic diversity of these taxa within Hungary. Surveys were undertaken in collaboration with nature conservation experts of the Hungarian national parks.

TABLE 5

Distribution of important CWRs' taxa in the Hungarian flora

Wild relatives of	Genus	No of taxa	Wild relatives of	Genus	No of taxa
Cereals (11)	<i>Aegilops</i>	1	Forage legumes (92)	<i>Anthyllis</i>	3
	<i>Avena</i>	1		<i>Astragalus</i>	11
	<i>Hordeum</i>	2		<i>Coronilla</i>	5
	<i>Panicum</i>	1		<i>Cytisus</i>	8
	<i>Secale</i>	1		<i>Lotus</i>	5
	<i>Setaria</i>	5		<i>Medicago</i>	7
Pulses (18)	<i>Lathyrus</i>	17		<i>Melilotus</i>	4
	<i>Pisum</i>	1		<i>Onobrychis</i>	1
Oil & fibre crops (13)	<i>Cannabis</i>	1		<i>Tetragonolobus</i>	1
	<i>Camelina</i>	3		<i>Trifolium</i>	25
	<i>Crambe</i>	1	<i>Trigonella</i>	3	
	<i>Linum</i>	8	<i>Vicia</i>	19	



Wild relatives of	Genus	No of taxa
Vegetables (27)	<i>Allium</i>	16
	<i>Apium</i>	1
	<i>Brassica</i>	1
	<i>Daucus</i>	1
	<i>Lactuca</i>	5
	<i>Pastinaca</i>	1
	<i>Raphanus</i>	1
	<i>Sinapis</i>	1

Wild relatives of	Genus	No of taxa
Grasses (62)	<i>Agropyron</i>	4
	<i>Agrostis</i>	3
	<i>Anthoxanthum</i>	1
	<i>Arrhenatherum</i>	1
	<i>Bromus</i>	14
	<i>Dactylis</i>	2
	<i>Festuca</i>	19
	<i>Lolium</i>	4
	<i>Phleum</i>	3
<i>Poa</i>	11	
Total		223

The Active Collection contains 6 196 CWRs accessions representing 189 taxa. Due to the purposeful seed exchange, collection and genebank activities carried out by the RCA the increase was approximately 68% between 1996 and 2007 (Table 6).

TABLE 6
Increase of CWRs samples in the Active collection by associated crop groups

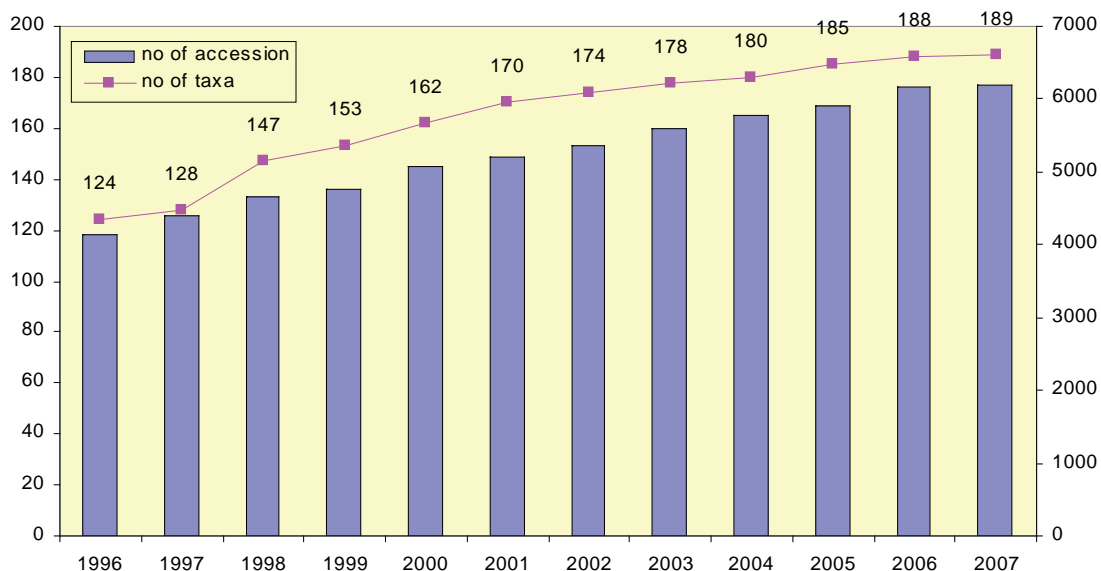
Period	Grasses	Cereals	Vegetables	Legumes*	Others**	Total
1973-1995	1 286	202	132	1 981	83	3 684
1996-2007	1 049	426	251	559	227	2 512
Total	2 335	628	383	2 540	310	6 196

* Food and forage legumes

** Medicinal, industrial, ornamental plants

Although the wild relatives of legumes with 2 540 accessions represent the highest proportion in the collection (41%), the CWRs of cereals and vegetables has experienced the most dynamic growth (Figure 10).

FIGURE 10
Increase of CWRs in the Active Collection (number of accessions and taxa, 1996-2007)



THE STATE OF *IN SITU* MANAGEMENT

In situ conservation of crop wild relatives and landraces is closely associated with nature conservation. Populations of several crop wild relatives live in protected natural habitats, and such areas can also play an important role in “*in situ* on-farm” conservation of locally developed landraces.

TABLE 7
Changes in the protected natural areas between 1997 and 2007¹⁰

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
The number of national parks (pc)	9	9	9	9	9	10	10	10	10	10	10
Total area of national parks (ha)	423 700	429 415	440 839	440 839	440 928	484 883	484 883	484 126	486 056	485 806	485 864
The number of landscape protection areas (pc)	35	37	38	38	38	36	36	36	36	36	37
Total area of landscape protection areas (ha)	319 832	341 696	349 242	349 242	349 641	309 817	309 817	316 677	324 014	324 035	326 743
The number of nature conservation areas (pc)	139	146	141	142	142	142	143	144	147	152	162
Total area of nature conservation areas (ha)	25 462	26 440	25 853	25 927	25 927	25 927	25 937	27 687	28 950	29 191	32 095
Total area	768 994	797 551	815 934	816 008	816 496	820 627	820 637	828 490	839 020	839 032	844 702

Protected natural areas can provide optimal conditions for long-term maintenance of protected species. The Hungarian law (especially “*Act on nature conservation*” No. LIII. of 1996) classifies protected natural areas (on the basis of the extent of measures of conservation, their aims and national and international importance) into the following categories¹¹:

Protected natural areas and assets of national interest

1. Natural areas protected by a specific law
 - National park
 - Landscape protection area
 - Nature conservation area
 - Natural monument
2. *Ex lege* protected natural areas
 - All qualified as nature conservation area
 - Bogs
 - Alkaline lakes
 - All qualified as natural monument
 - Tumulus
 - Earth fortifications
 - Springs
 - Sinkholes
3. *Ex lege* protected natural assets

¹⁰ KJK KERSZÖV Jogi és Üzleti Kiadó Ltd. (2004): CD Jogtár (CompLex)

¹¹ Source: State Secretariat for Nature and Environment Protection: www.termeszetvedelem.hu



Protected natural areas of local interest

1. Nature conservation area
2. Natural monument

National parks, landscape conservation areas and nature conservation areas (with national or local interest) are the most important protected habitats for crop wild relatives (Table 7).

In addition to these protected areas, there are Ramsar sites and biosphere reserves treated similarly (Table 8). Hungary ratified the Ramsar convention in 1979. Although the main aim of the convention is the protection of wetlands (as birds-habitats) a number of protected plants including CWRs live in these areas (Table 9). Both Ramsar sites and biosphere reserves are areas protected by laws¹².

TABLE 8
Changes in the area of Ramsar sites¹³

Year	Number of Ramsar-sites (pc)	Area of Ramsar-sites (ha)
1996	13	124 075
1997	19	149 844
1998	19	149 844
1999	19	149 844
2000	19	149 844
2001	21	154 146
2002	21	154 146
2003	23	177 226
2004	23	177 226
2005	23	177 226
2006	26	197 955
2007	26	197 955

Ecologically sensitive areas can also play an important role in "in situ" conservation of landraces. Over 3 million hectares have been identified as ecologically sensitive areas in Hungary. It is anticipated that continued high input and intensive agricultural practices would lead to further degradation of such areas. Strict restrictions in land management and use of fertilizers and pesticides should be introduced to prevent the degradation of natural, semi-natural and agro-ecosystems in these sensitive areas¹⁴.

TABLE 9
List of protected crop wild relatives occurring in Ramsar sites¹⁵

<i>Aster tripolium pannonicus</i>	<i>Limonium gmelini</i>
<i>Butomus umbellatus</i>	<i>Nuphar luteum</i>
<i>Carpesium abrotanoides</i>	<i>Nymphaea alba</i>
<i>Cirsium brachycephalum</i>	<i>Nymphoides peltata</i>
<i>Crataegus nigra</i>	<i>Ophrys sphegodes</i>
<i>Dryopteris carthusiana</i>	<i>Orchis palustris</i>
<i>Eriophorum ssp.</i>	<i>Orchis purpurea</i>
<i>Gentiana pneumonanthe</i>	<i>Plantago schwarzenbergiana</i>

¹² Source: State Secretariat for Nature and Environment Protection: www.termeszetvedelem.hu

¹³ Source: Ramsar Convention in Hungary www.ramsar.hu

¹⁴ Holly L., Gyovai Á., Már I., Málnási Csizmadia G., Horváth L., Kollár Zs. (2002): Az ökológiailag érzékeny területek lehetséges szerepe az agro-biodiverzitás megőrzésében. Acta Agronomica Hungarica. 2002, pp. 145-154 Budapest

¹⁵ Source: Ramsar Convention in Hungary www.ramsar.hu

<i>Iris pseudacorus</i>	<i>Puccinellia distans</i>
<i>Iris sibirica</i>	<i>Puccinellia peisonis</i>
<i>Iris spuria</i>	<i>Sagittaria sagittifolia</i>
<i>Lepidium crassifolium</i>	<i>Suaeda pannonica</i>
<i>Leucanthemella serotina</i>	<i>Trapa natans</i>
<i>Leucanthemum serotinum</i>	<i>Urtica kioviensis</i>
<i>Leucojum aestivum</i>	<i>Utricularia vulgaris</i>

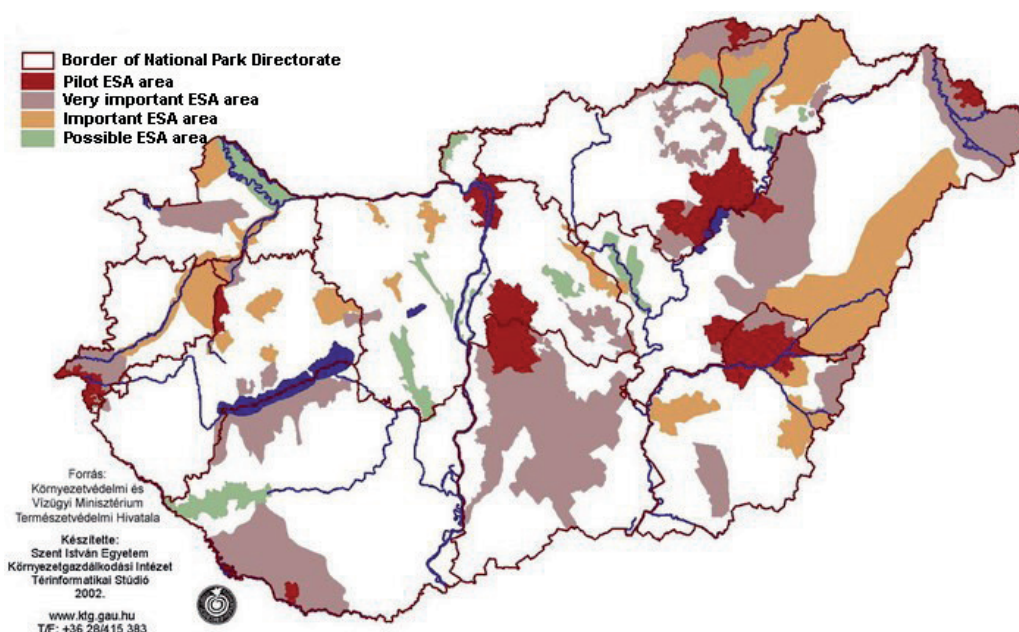
In Hungary the definition of Environmentally Sensitive Area (ESA) was first used in the *Act on nature conservation No. LIII. of 1996*. Accordingly, ESAs are such areas (Figure 11), within which low input cultivation should be applied and conservation of biodiversity, diverse habitats and cultural and natural values should receive high priority¹⁶.

The establishment of ESA system is attached to the National Agri-environmental Program (*Government declaration NAKP – 2253/1999*). The joint decree of the Ministry of Environmental Protection and the Ministry of Agricultural and Rural Development (*2/2002 (I.23.) KöM – FVM rendelet*) has regulated the designation of ESAs¹⁷.

The different ESAs are classified on the basis of the level of protection required¹⁸ (Table 10):

- Very important areas. These areas and their values are internationally recognized. Without low-input production their maintenance is doubtful in medium time period.
- Important areas. They have national values. Low-input production is necessary to the conservation of their values or to improve their condition.
- Possible areas. The rate of agricultural, extensive areas is large, whereas the importance of natural and land values is less. The natural value of these areas can be increased by supporting extensive cultivation.
- Pilot areas. In 2000 one ESA in each national parks was established as a pilot area for further studies.

FIGURE 11
Environmentally Sensitive Areas in Hungary¹⁹



The agri-environmental effect of the Natura 2000 Network is similar to that of the ESAs.

Twenty-one percent of Hungary's area is part of the Natura 2000 Network. The indicated areas comprise agricultural areas such as arable fields, grasslands, pastures and wetlands where traditional production has been going on for a long time.

¹⁶ "Act on nature conservation" No. LIII. of 1996

¹⁷ Ángyán J. – Tardy J. – Vajnáné Madarassy A. (szerk.) (2003): *Védett és érzékeny természeti területek mezőgazdálkodásának alapjai*. Budapest: Mezőgazda Kiadó

¹⁸ Ángyán J. – Tardy J. – Vajnáné Madarassy A. (szerk.) (2003): *Védett és érzékeny természeti területek mezőgazdálkodásának alapjai*. Budapest: Mezőgazda Kiadó.

¹⁹ Ángyán J. – Tardy J. – Vajnáné Madarassy A. (szerk.) (2003): *Védett és érzékeny természeti területek mezőgazdálkodásának alapjai*. Budapest: Mezőgazda Kiadó



TABLE 10
The areas and relative proportions of ESA categories

ESA categories	Area (1000 ha)	Ratio (%)
Pilot area	179.4	1.9
Very important area	1 883.2	20.2
Important area	936.4	10.1
Possible area	294.4	3.2
Total	3 293.7	35.4
Country total	9 300.8	100.0

In the frame of an IPGRI global project (*Strengthening the scientific basis of in situ conservation of agricultural biodiversity*) the Institute for Agrobotany (predecessor of the RCA) conducted detailed surveys in three ESAs (*Szatmár-Bereg, Dévaványa, Őrség-Vendvidék ESA*). The agricultural diversity and biodiversity were assessed and documented. Results of the surveys supported the expectation that areas where high input intensive crop production technologies are harmful to the environment, provide excellent conditions for the conservation of traditional farm management and local landraces²⁰.

The following organisations and NGOs are engaged in nature protection and maintenance of biological diversity in Hungary:

- *Ecological Institute for Sustainable Development* (www.econlist.hu): the mission of the Ecological Institute for Sustainable Development includes the promotion of sustainable development, the improvement of the ecological culture, the education of global thinking, and – through all these – the elaboration of the fundamentals of the realisation of sustainable development in practice, promotion and awareness raising. Activities of the Ecological Institute Foundation cover:
 - Elaboration and implementation of sustainable rural development models,
 - Spreading information and knowledge of sustainability,
 - Participation in sustainable development-related policy making processes,
 - Environmental awareness raising,
 - Assertion of environmental interests,
 - Environmental impact assessments,
 - Development of (environmental) databases,
 - GIS data processing,
 - Development of community-level environmental programmes.
- *Ormánság Foundation* (ormansag@axelero.hu): The aims of the foundation are:
 - The protection of lands against damages
 - Improvement of land's condition by developing and spreading adequate landscape management techniques
 - Training and advising interested people
 - Propagation of local fruit varieties and distribution of graftings.
- *Gyűrűfű Foundation, Gyűrűfű Society* (www.gyurufu.hu): Gyűrűfű is a self-supporting village in the south-western part of Hungary. The people in the village intend to live in harmony with nature. The most important aims of the society and foundation:
 - Establishment of the harmonic coexistence model in terms of nature, technology and sociology
 - Representation of the interests of the members of the society
 - Training ("Jurta" University, permaculture course), advising.
 - Ensure democratic frame of local government.
 - Dealing with social problems of local population.
- *Association of Visnyeszéplak Village's Protection* (www.visnyeszepalak.hu): Visnyeszéplak is a self-supporting village in the region of Zselic. The local population tries to live in harmony with nature. They realize it through ecological farming and production. The most important aims of the association:
 - Protection of natural values of Zselic
 - Development of ecological wood felling and cutting methods

²⁰ Holly L., Gyovai Á., Már I., Málnási Csizmadia G., Horváth L., Kollár Zs. (2002): Az ökológiailag érzékeny területek lehetséges szerepe az agro-biodiverzitás megőrzésében. Acta Agronomica Hungarica. Budapest.

- Cultural, social questions and problems of local population
- Training and advising interested people.
- Gaia Ecological Foundation (www.gaiaalapitvany.hu):
 - Participation in the local rural development
 - Participation in the functioning of Galgafarm (The first Hungarian Organic Agricultural Society)
 - Participation in the functioning of Galgahévíz Ecovillage
- *Eco-resources Foundation*, Budakeszi:
 - Participation in the on-farm evaluation and maintenance of land races
 - Safeguarding the scientific heritage of Prof. Andor Jánosy
 - Utilizing local landraces in ecological farming and on-farm selection
- *Hungarian Permaculture Association* (www.permakultura.hu):
 - Training, advising
 - Spreading of permaculture methodology
 - Low-input production (use of landraces)
- *Biohistorical site of Szarvasgede* (gyulai.ferenc@kti.szie.hu):
 - Production of einkorn and fruit landraces (more than 200 landraces – cherry, sour cherry, apricot, plum, apple, pear – from the Carpathian Basin)
 - Archeobotanical researches
 - Participation in higher education
- *Nimfea Nature Conservation Association* (www.nimfea.hu): The “Nimfea” works in the Great Hungarian Plain as a non-governmental organisation, solving tasks related to the environment- and nature protection. The association deals with practical realization of local sustainable agricultural production.
- *Hungarian Bioculture Union* (www.biokultura.org):
 - Low-input production, ecological production
- *Magonc Foundation* (<http://magonc.org>):
 - Environmental education
- *Pangea Cultural and Environmental Heritage Protection Association* (www.pangea.hu):
 - Environmental education (camps for children, on the spot training),
 - Low-input production: biological farming with landraces,
 - Biological sewage systems.
- *CEEweb for Biodiversity* (www.ceeweb.org): The mission of CEEweb for Biodiversity is the conservation of the biodiversity through the promotion of sustainable development. CEEweb represents the network of several dozens of nature conservation organizations from Central and East European countries, working together to protect the biological heritage of the region. The rich natural heritage, which is vital to the rejuvenation of these countries, is threatened by intensive agriculture, forestry and resource exploitation as well as infrastructure developments. The working groups of CEEweb are:
 - Rural Development Working Group,
 - CITES Working Group,
 - Natura 2000 Working Group,
 - Sustainable Tourism Working Group,
 - Policy Working Group.



THE STATE OF *EX SITU* MANAGEMENT

The collection, conservation and utilization of the plant genetic resources for food and agriculture has a well established tradition and long history in Hungary. Several institutes, research stations, universities, botanical gardens (altogether 64 participants, according to the latest figures for 2003) have been involved in the gene bank activities, but the largest *ex situ* collections are maintained by the CAO, Research Centre for Agrobotany, at Tápíószele.

3.1 Central Agricultural Office, Research Centre for Agrobotany, Tápíószele

The National Institute for Agrobotany, as the predecessor of the CAO, RCA was founded by the Ministry of Agriculture in 1958 with the following responsibilities:

"...collection, maintenance and taxonomic, botanical, physiological, biochemical as well as plant pathological examination of domesticated plant species, and a world collections of cultivated crops".

After several reorganizations, the RCA has been functioning as a department of the CAO since 1st January 2007.

In spite of the reorganisations, the RCA has been keeping its responsibilities concerning the development and maintenance of collections of field and vegetable crop genetic resources and has performed overall genebank activities for 50 years including the following tasks:

- Exploration and collection of genetic resources of field and vegetable crops with special emphasis on local Hungarian material,
- Medium- and long-term conservation of seed samples in cold storage rooms and by using meristem cultures in the case of vegetatively propagated crops,
- Multiplication and regeneration of accessions in order to obtain sufficient quantities of high quality seeds for medium- and long-term conservation, evaluation and distribution,
- Isoclimatic regeneration of Hungarian landraces, ecotypes and populations on their places of origin (*in situ*, on-farm and home garden multiplication),
- Characterization and evaluation of plant genetic resource (PGR) collections according to internationally accepted descriptor lists,
- Development and maintenance of the National Base Collection for seed-propagated crops,
- Documentation of passport and evaluation data for the PGR collections maintained by RCA and other partners in Hungary (National Database),
- Distribution of seed samples to users together with relevant information,
- Nationwide responsibility for the technical coordination of Hungarian PGR activities,
- Participation in the ECP/GR and other international and national programmes.

3.1.1 The collections of RCA

The collection of RCA consists of Active, Base, *In vitro* and Field Collections contains a total of 87 373 accessions representing 1 914 taxa of 314 genus (Table 11). Due to the increase in sample numbers in the Active (from 46 489 to 75 598) and the Base collections (from 7 870 to 11 158), the collections of seed-propagated crops expanded 59.7% between 1996 and 2007. Within the number of taxa increased from 1290 to 1914 in the same period of time.

TABLE 11
Distribution of the collections at the RCA by crops (2008)

Crops	Active	Base	<i>In vitro</i>	Field	Total
Cereals	33 037	3 167			36 204
Food legumes	14 139	2 446			16 585
Forage legumes	4 926	410			5 336
Grasses	3 201	283			3 484
Industrial crops	6 131	932			7 063
Medicinal plants	1 165	70			1 235
Roots & tubers	349	33	474	54	910
Vegetables	12 378	3 807		89	16 274
Other	272	10			282
Total	75 598	11 158	474	143	87 373

The group of cereals represents the highest proportion of the collection with 36 204 accessions (41.1%) followed by food legumes with 16 585 (19.0%) and vegetables with 16 274 accessions (18.6%) (Figure 12).

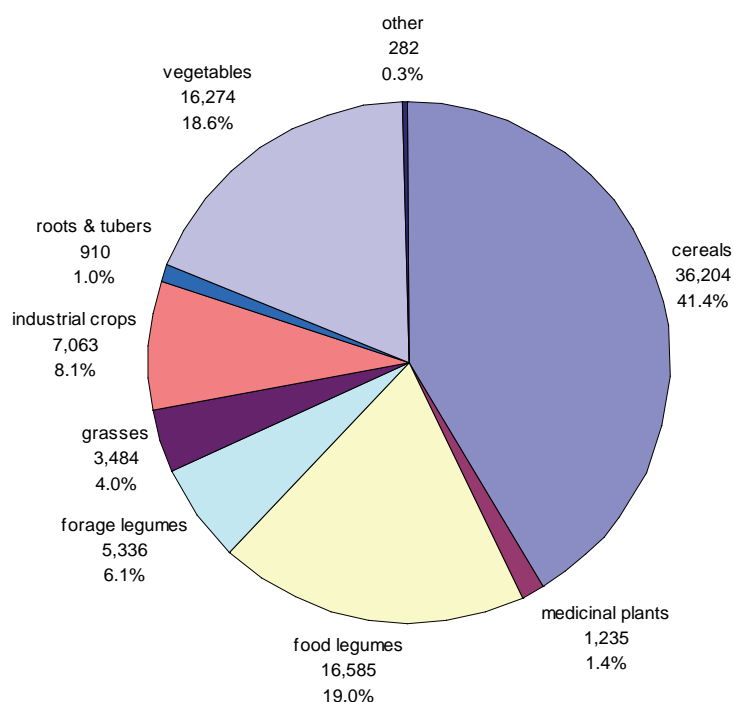
The collections of RCA show a wide range of diversity by country of origin. Five continents with 108 countries are represented as sources of germplasm (Table 12). 56.6% of the accessions originate from 44 European countries. The most important part of the collections originated from Hungary (30 780 accessions).

TABLE 12
Distribution of the number of accessions by continents of origin and acquisition periods

Continent	Before 1996		Between 1996 and 2007		Total	
	Country	Accession	Country	Accession	Country	Accession
Asia	26	1 912	28	1 389	29	3 301
Africa	17	479	19	259	20	738
Europe	34	30 404	43	18 746	44	49 150
North & Mid America	5	1 950	6	986	6	2 936
South America	7	299	5	102	7	401
Australia and Oceania	2	264	2	125	2	389
unknown		15 248		14 593		29 841
Sum total	91	50 556	103	36 200	108	86 756



FIGURE 12
Distribution of the collections of RCA by crop groups in 2007



When comparing the composition of collections in 1995 and 2007, it appears that, in spite of the increase in the number of accessions and of taxa, only small changes occurred in the relative ratios of the main crop groups (Table 13).

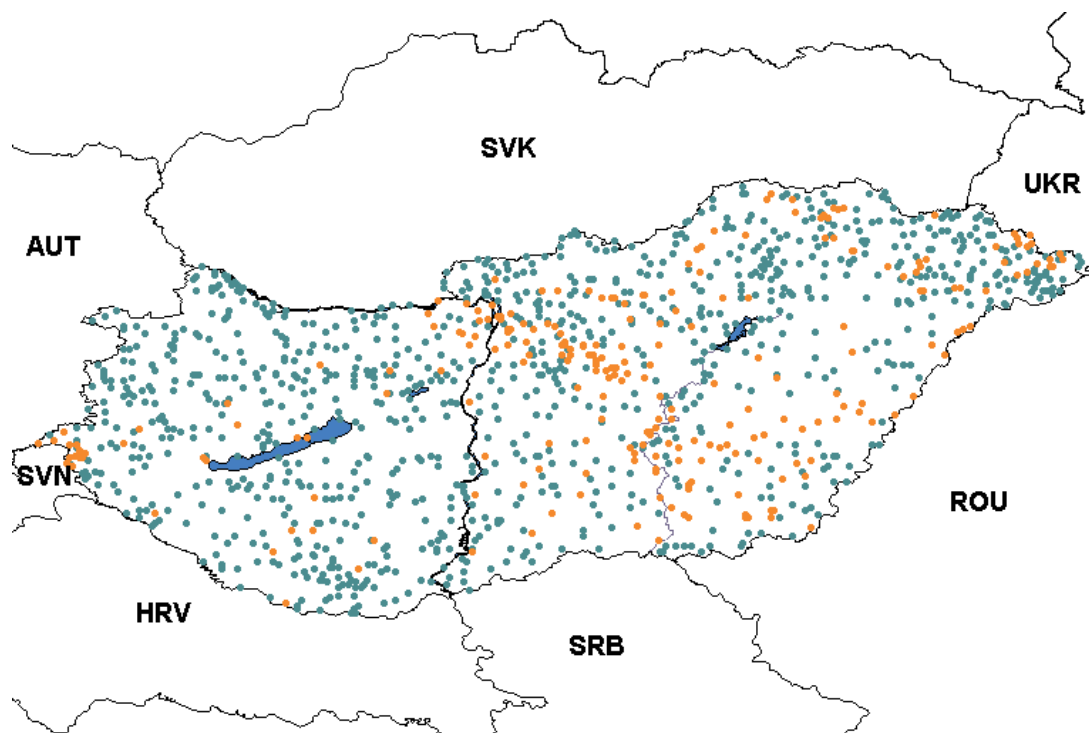
TABLE 13
Distribution of collections by crop groups in 1995 and 2007

Crop groups	1995 percentage of total	2007 percentage of total
Medicinal crops	0.7%	1.4%
Cereals	40.9%	41.4%
Food legumes	20.4%	19.0%
Forage legumes	8.0%	6.1%
Grasses	4.0%	4.0%
Ornamentals	0.1%	0.3%
Industrial crops	8.5%	8.1%
Roots and tubes	1.4%	1.0%
Vegetables	16.7%	18.6%

The number of native germplasm accessions showed a considerable increase during the last eleven years (from 12 271 in 1996 to 30 780 in 2007).

35.5% of the entire collection (30 780 accessions) originated from Hungary. 80.1% of the Hungarian accessions maintained in the collections of RCA are landraces and ecotypes collected from 1 364 collecting sites (Figure 13).

FIGURE 13
Collecting sites in Hungary



• Collections before 1996, • Collections between 1996-2007

The collecting missions contributed to a great extent to the growth of RCA's collections. Identification of redundant duplicates has started on the basis of passport information and evaluation data. Duplicates are also used for the reconstruction of traditional cultivars.

3.1.2 The National Base Collection and the National Gene Bank Database

The National Base Collection was established in 1997 according to the ministerial decree No. 92/1997 (XI. 28.) on the conservation and utilisation of plant genetic materials stating that “*all organisations (every natural and legal person and economic corporation without legal personality) that possess gene bank collections approved and registered by the Plant Gene Bank Council and that are commissioned by the government to maintain or to take part in the maintenance and utilisation of these collections in order to support agriculture, horticulture, forestry and food production and to conserve and utilize biological diversity, are obliged to provide seed samples of accessions, regenerated using financial support provided by the Ministry, for the National Base Collection for seed propagated species.*”

According to the decree, financial support is available for all institutes carrying out genebank activities if they meet the following conditions and requirements:

- The applicants should possess unique germplasm, not duplicated in existing germplasm collections;
- The material should be made freely available;
- A basic set of passport and/or collecting information should be supplied to the National Gene Bank Database (Table 14);
- After multiplication of the accessions, the applicants should arrange for long-term preservation of the material in the National Base Collection (Figure 14);
- Supported genetic resources activities should be conducted in accordance with international standards (FAO/IPGRI Genebank standards, IBPGR/IPGRI descriptor lists).



FIGURE 14
Development of the NBC

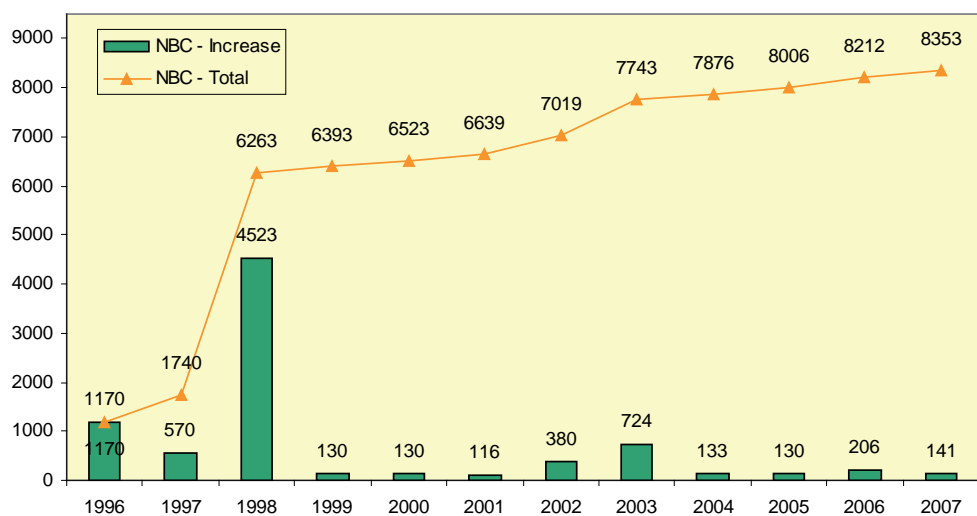


TABLE 14
Increase of NGBDB and NBC

Year	NGBDB		NBC	
	Increase in number of accessions	Accumulated sum	Increase in seed samples	Accumulated number of samples
1996	1 170	1 170	1 170	1 170
1997	570	1 740	570	1 740
1998	4 523	6 263	4 523	6 263
1999	130	6 393	130	6 393
2000	130	6 523	130	6 523
2001	116	6 639	116	6 639
2002	380	7 019	380	7 019
2003	724	7 743	724	7 743
2004	133	7 876	133	7 876
2005	130	8 006	130	8 006
2006	206	8 212	206	8 212
2007	141	8 353	141	8 353
2008	8 943	17 296		

The NGBDB is the documentation basis for the National Inventory and the NBC. The NGBDB contains passport information for 17 296 accessions of 317 taxa belonging to 115 genera (Figure 15) provided by 19 institutions (Table 15) maintaining active collections.

FIGURE 15
Distribution of the NGBDB by crop groups

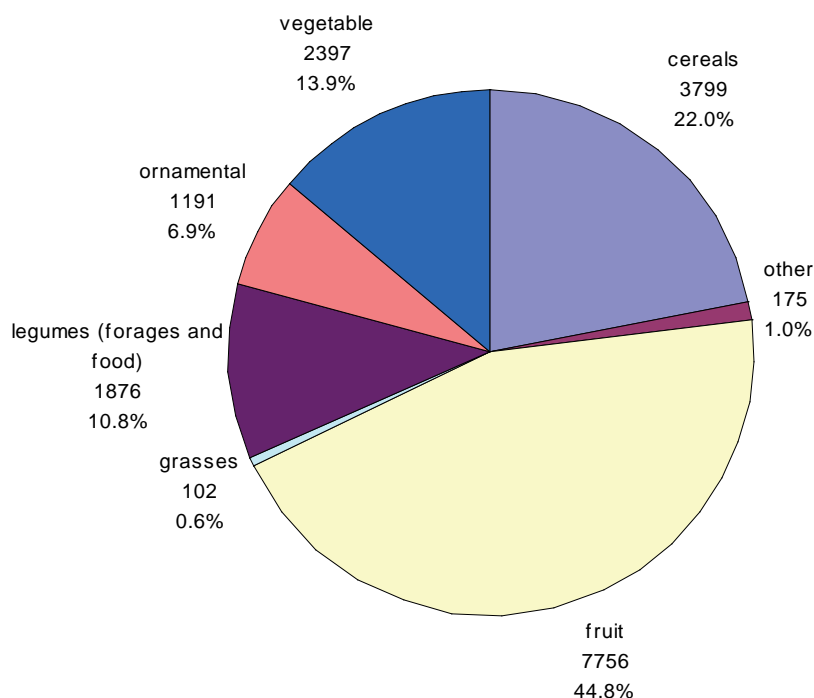


TABLE 15
The participants and their contributions to the NGBDB and the NBC

Participants, contributors	NBC	NGBDB
DATE Kutató Központja, Nyíregyháza	249	249
DATE Kutató Központja, Teichmann Telep, Kiszvárd	386	386
Dr. Szalva Péter, Szentés	138	138
GK Kht., Szeged	3 137	3 137
GYDTKF KHT, Érd		3 626
Gyógynövény Kutató Intézet, Budakalász	48	48
GYTKFI KHT, Cegléd		1 976
GYTKFI KHT, Fertőd		1 228
GYTKSZ KHT, Újfehértó		2 113
KÉE, Gyógynövénytermesztési Tanszék, Budapest	9	9
MTA MKI, Martonvásár	293	293
RCA, Tápiószéle	828	828
Szentési Mag Kft., Szentés	35	35
ZKI Rt. Budapesti Állomás, Budapest	805	805
ZKI Rt. Fűszerpaprika Kutató Állomás, Kalocsa	83	83
ZKI Rt. Kutató Állomás, Makó	230	230
ZKI Rt. Kutató Állomás, Újmajor	556	556
ZKI Rt., Kecskemét	245	245
VE, Georgikon Mgtudományi Kar, Kertészeti Tanszék, Keszthely	1 311	1 311
Total	8 353	17 296



3.2 The Hungarian National Inventories for PGRFA

According to the latest application for support of the national genebank activities, the total number of accessions of the Hungarian National Inventories is 144 340 accessions including the collections of RCA (Table 16).

TABLE 16

The number of institutions holding PGR collections and their contributions to the NI

Crop groups	2003			1996		
	No of inst.*	No of acc.*	RCA**	No of inst.	No of acc.	RCA
Fruits	12	8 067				
Grape	11	4 758		11	4 316	
Field crops	12	89 716	69 582	14	52 988	37 246
Medicinal plants	5	4 789	1 235			
Micro-organisms	9	2 890				
Ornamentals	22	10 392	282			
Vegetables	9	23 728	16 274	14	15 866	8 587
Sum total		144 340	87 373		73 170	45 833

*RCA included

**information from 31st, December 2007

The number of participants has doubled, increasing from 29 to 64 (Table 17). The amount of the genetic resources has increased from 73 170 to 144 340 performing 80.3% growth since the first FAO country report, 1996.

TABLE 17

PGR collection holders and number of PGR holdings by crop groups in 2003

Institutions								Sum
	Field Crops	Fruits	Grape	Medicinal Plants	Microorganism	Ornamental	Vegetables	
AGROTAB Nemesítő és Vetőmagtermeltető Kft.	134							134
ARIZONICA Kertészeti és Szolgáltató Bt.						149		149
Bükki Nemzeti Park Igazgatóság Erdőtelki Arborétum						89		89
Ceglédi Gyümölcsstermesztési Kutató - Fejlesztő Intézet KHT		172						172
DE ATC Kutató Központ	2 327							2 327
DE ATC MTK Genetikai és Nemesítési Tanszék	310							310
DE ATC						103		103
DE ATC Mezőgazdaságtudományi Kar Gyümölcsstermesztési Tanszék		257	166					423
DE ATC Gyümölcsstermesztési Tanszék		18						18
DE ATC Karcagi Kutatóintézet	989							989
Dendrológiai Alapítvány						107		107
Dr. Szentiványi Péter		101						101
Duna-Ipoly Nemzeti Park Igazgatóság						224		224
Eötvös Loránd Tudományegyetem Botanikus Kert						1 419		1 419
Erdészeti Tudományos Intézet						567		567
Erdészeti Tudományos Intézet Gödöllői Arborétum						182		182
Érdi Gyümölcs- és Dísznövénytermesztési Kutató-Fejlesztő Kht.		2 983				80		3 063
Fejér Megyei Növény- és Talajvédelmi Szolgálat					944			944
Fűszerpaprika Kutató-Fejlesztő KHT.							252	252

Institutions	Field Crops	Fruits	Grape	Medicinal Plants	Microorganism	Ornamental	Vegetables	Sum
FVM Szőlészeti és Borászati Kutató Intézete, Eger			455					455
FVM Szőlészeti és Borászati Kutató Intézete, Kecskemét			993					993
FVM Szőlészeti és Borászati Kutató Intézete, Pécs			924					924
FVM Szőlészeti és Borászati Kutatóintézete, Badacsony			102					102
FVM Szőlészeti és Borászati Kutatóintézete, Kecskemét					150			150
Gabonatermesztési Kutató KHT	6 719							6 719
Gyógynövény Kutató Intézet Rt.				2 198				2 198
Hajzer Julianna						433		433
Kaposvári Egyetem Takarmánytermesztési Kutató Intézet Iregszemcse					142			142
Kertész Termelő és Értékesítő Szövetkezet						119		119
Magyar Természettudományi Múzeum Növénytára					190			190
Magyar Tudományos Akadémia Mezőgazdasági Kutatóintézete	2 893							2 893
Márk Gergely						411		411
Márton Péter						371		371
Mátra-Tan Kutató Oktató KHT		170	540					710
Mezőgazdasági Kutató-Fejlesztő KHT	354							354
Miskolci Avasi Arborétum Baráti Kör						538		538
MTA Növényvédelmi Kutatóintézete					27			27
MTA Ökológiai és Botanikai Kutatóintézet Botanikus Kert Vácrátót						1 615		1 615
NyFM és Mgi Főiskolai Kar, Kertészeti és Élelmiszertechnológiai Tanszéke							114	114
NyME Botanikus Kertje						1 126		1 126
NyME Mg- és Élelmiszertudományi Kar, MAC	889							889
NyME Mg- és Élelmiszertudományi Kar, MAC, Kertészeti Tanszék		143						143
Országos Mezőgazdasági Minősítő Intézet**	3 306	1 605	363	10	210	170	2 634	8 298
ÖKOHERBA Kft.				280				280
Pilis Parkerdő Rt.						178		178
QUALITY CHAMPIGNONS Kft.							840	840
RCA, Tápiószéle*	69 582			1 235		282	16 274	87 373
SzIE, Kertészettudományi Kar Genetika és Kertészeti Növénynevelési Tanszék							340	340
SzIE, Kertészettudományi Kar Gyógy- és Arománövények Tanszék				1 066				1 066
SzIE Budai Területi Iroda, Mgi és Ipari Mikroorganizmusok Nemzeti Gyűjteménye					810			810
SzIE Gazd. és Mgi. Főiskolai Kar Gyöngyös F. R. Kutatóintézete Kompolt	1 880							1 880
SzIE KTK Dísznövénytermesztési és Dendrológiai Tanszék						1 798		1 798
SzIE KTK Gyümölcsstermő Tanszék					134			134
SzIE KTK Növénytani Tanszék és Soroksári Botanikus Kert						180		180
SzIE KTK, Genetikai és Kertészeti Növénynevelési Tanszék		300	319					619
SzIE KTK, Gyümölcsstermő Növények Tanszék		1 056						1 056
SzIE KTK, Szőlészeti Tanszék			40					40
Szőlőskert Borászati és Hűtőipari Rt.			99					99
Újfehértói Gyümölcsstermesztési Kutató és Szaktanácsadó KHT.		1 091						1 091
Varga Márton Kertészeti és Földmérési Szakképző Intézet						251		251
VE Georgikon Mezőgazdasági Kar, KAC		171	757		283		1 040	2 251
VE Georgikon Mezőgazdasági Kar, KAC, Regionális Burgonyakutatói Központ	333							333



Institutions	Field Crops	Fruits	Grape	Medicinal Plants	Microorganism	Ornamental	Vegetables	Sum
Zöldségtermesztési Kutató Intézet Rt.							106	106
Zöldségtermesztési Kutató Intézet Rt. Budapesti Állomása							2 128	2 128
Total holdings	89 716	8 067	4 758	4 789	2 890	10 392	23 728	144 340
Number of collection holding institutions	12	12	11	5	9	22	9	

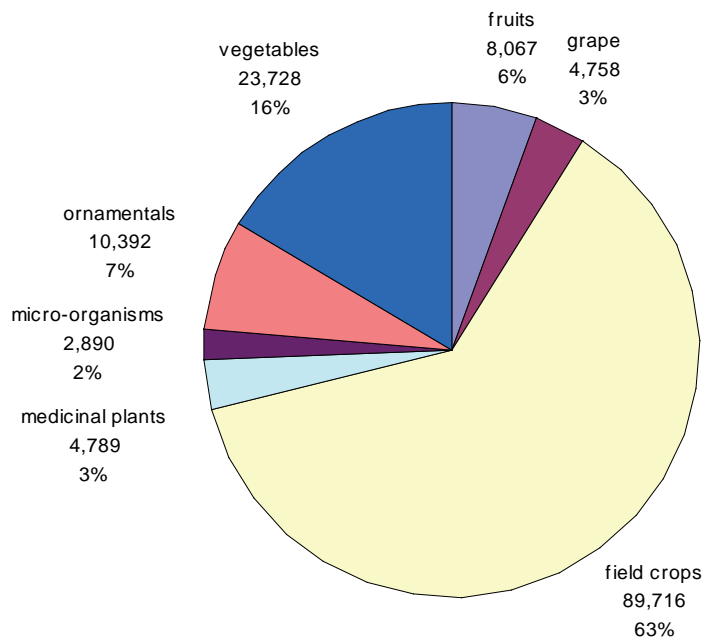
* Data from 2007;

** Reference collection, temporarily unavailable for distribution

The group of field crops and their wild relatives represent the largest proportion of the National Inventory (62.2% of the total items). It accounts for 89 716 accessions (Figure 16) and is followed by accessions of vegetables (23 728), ornamentals (10 392), fruits (8 067), medicinal plants (4 789), grape (4 758) and micro-organisms (2 890).

FIGURE 16

Distribution of the Hungarian Inventory by crop group



THE STATE OF USE

At the RCA 15-20 ha is used for genebank nurseries and other field trials each year. In spite of several reorganizations, causing the decline of the capacity (labour, financial etc.) approximately 3 500 accessions are regenerated, multiplied each year. Approximately 90% of the cereals and legumes, 50% of the root and tuber crops, 75% of the vegetable crops, 80% of the forage crops and 30% of the underutilized crops have been characterized and evaluated.

The documentation of PGRFA has improved in Hungary: approximately 45% of all PGRFA holdings are documented electronically.

The RCA distributed altogether 9 769 accessions to Hungarian (6 289 accessions) and foreign partners (3 480 accessions) between 1996 and 2007 (Table 18).

TABLE 18

Distribution of PGR samples by crop group and year

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	SUM	
National	Cereals	82	181	105	110	145	209	80	557	218	190	150	200	2 227
	Food legumes	26	26	74	52	139	44	45	88	108	102	47	245	996
	Forage legumes	13	18	144	10	9	19	1	21	1	10	6	15	267
	Grasses		46	21	1						5	27	17	117
	Industrial crops	7	15	1	77	11	32	94	244	13	278	33	67	872
	Medicinal plants	5	15	3	16	8	21	1	1	36	21	12	43	182
	Ornamentals	1	1						2	2	1	1	7	15
	Roots and tubers		23	1	1		16	1	1		10	10	29	92
	Vegetables	41	33	65	33	33	100	61	117	29	213	248	548	1 521
	Inland SUM	175	358	414	300	345	441	283	1 031	407	830	534	1 171	6 289
Foreign	Cereals		199	220	231	42	102	62	109	155	74	10	13	1 217
	Food legumes		51	37	40	99	22		117	1	15	16	1	399
	Forage legumes			92	28	131	13	2	23	12	9	14	40	364
	Grasses		23	95	122	51	87			18	33	20	8	457
	Industrial crops		12	28	6	3	3		2	13	6	17	3	93
	Medicinal plants			18	14	20	2		16	10	1	4		85
	Ornamentals			6	2	1				3		1		13
	Roots and tubers				10	4	1	1						16
	Vegetables		30	199	266	71	24	33	85	47	19	53	9	836
	Foreign SUM		315	695	719	422	254	98	352	259	157	135	74	3 480
Total	175	673	1 109	1 019	767	695	381	1 383	666	987	669	1 245	9 769	

The number of samples of PGRFA distributed yearly to domestic users increased, the number distributed to foreign users decreased in the given period. The total 3 480 accessions distributed to foreign users had been requested for scientific purposes. From the 25.7% of the total 6 289 accessions distributed to Hungarian users, 1 614 accessions were forwarded for direct use in farming or gardening.

No special legislation and regulations have been developed or adapted in Hungary to support farmers' access to improved seeds and the marketing of diversity-rich products, including farmer varieties between 1996-2007.

The maintenance, regeneration, characterisation and reconstruction of the rare old varieties, and endangered species, varieties and landraces receive high priorities in the activity of RCA. During regeneration of the varieties, their original documentation and description is used to evaluate and to compare duplicate samples in order to select individual mother plants and lines showing the characteristics of the variety under reconstruction. Selected lines are bulked to form reconstructed populations and are multiplied in larger plots under isolation if required. According to this concept



71 accessions of 26 species have been involved into a project started with support from the Ministry of Agriculture and Rural Development, in 2007 (Table 19).

TABLE 19
Number of traditional varieties and landraces reconstructed

Crop group	Crop	No of varieties
Cereals	Wheat	2
	Maize	7
	Millet	
Food legumes	Bean	12
	Chickpea	1
	Vigna	3
	Horse bean	1
Forage	Sweet clover	1
	Pumpkin	2
Industrial crops	Sunflower	2
Tubers	Potato	1
	Jerusalem artichoke	2
Vegetable	Paprika	7
	Tomato	4
	Onion	3
	Garlic	4
	Garden leek	1
	Sand leek	1
	Bunching onion	1
	Spinach	1
	New zeland spinach	1
	Sorrel	7
	Savoy cabbage	1
	Parsley	2
	Celery	1
	Radish	1
Total		71

Landraces and old varieties chosen for reconstruction were important from the aspect of genetic characteristics and/or historical value. Their on-farm maintenance and utilization in the plant breeding programmes may contribute to the sustainable use of Hungarian plant genetic resources for food and agriculture.

THE STATE OF NATIONAL PROGRAMMES, TRAINING AND LEGISLATION



The existence of national programmes, training and legislation, as fundamental issues, are essential for a successful national gene bank activity.

5.1 The state of the National Plant Genetic Resources Programmes

In accordance to the *Decree No. 92/1997 (XI. 28.)* on the Conservation and utilisation of plant genetic materials, the National Plant Genetic Resources Programmes started in 1997. All organisations (every natural and legal person and economic corporation without legal personality) that possess gene bank collections approved and registered by the Plant Gene Bank Council and that are commissioned by the government to maintain or take part in the maintenance and utilisation of these collections, in order to support agriculture, horticulture, forestry and food production and to conserve and utilise biological diversity are obliged to put accessions into the NBC.

The National PGR Programme was financially supported by the Ministry of Agriculture and Rural Development from a Central Fund created for the support of the Preservation and Improvement of Biological Bases in Agriculture.

This support was available for all institutions carrying out genebank activities if they met the following requirements:

- The applicants should possess unique germplasm, not duplicated in existing germplasm collections;
- The material should be made freely available;
- A basic set of passport and/or collecting information should be supplied to the National Gene Bank Database;
- After multiplication of the accessions, the applicants should arrange for long-term preservation of the material in the National Base Collection;
- Supported genetic resources activities should be conducted in accordance with international standards (FAO/IPGRI Genebank standards, IBPGR/IPGRI descriptor lists).

After Hungary's EU accession in 2004, the funding of the Preservation and Improvement of the Biological Bases in Agriculture was suspended as certain components of the programme was considered incompatible with the EU regulations.

In 2007, negotiations started between the Ministry of Agriculture and Rural Development and the Ministry of Environment and Water in order to re-establish the national programme. The National Gene Bank Council was re-established in 2007 and discussed the current status of the national PGR collections and possible sources of a continued funding of the maintenance of still existing collections.

Funds have been allocated in the New Hungary Rural Development programme to support the *ex situ* collections of crop plants and the maintenance of traditional domesticated animal breeds. Funds will also be made available to provide subsidy to farmers using rare traditional cultivars or landraces under ecological or integrated farming conditions. Actions associated with PGR conservation and use will forseeingly start in 2009.

5.2 Training and education on PGRFA-related issues²¹

There are 150 state-approved qualifications in the agricultural industry, two-thirds of which can only be obtained through the school system as they demand more complex knowledge (i.e.: technician, higher training qualifications). Agricultural education is an integral part of the vocational training system and satisfies the needs of the Agricultural sector. Currently, several schools, high schools and universities offer agricultural education. These institutions enable students to obtain

²¹ The Hungarian Agriculture and food industry in figures; Földművelésügyi és Vidékfejlesztési Minisztérium, 2007

professional knowledge in all specialist fields and at all levels. Besides the Ministry, the authorities of the capital, the counties and the regions, and also churches and foundations maintain such schools.

Schools are involved not only in students and adult education and training, but have established extensive international professional relationships as well. Providing advisory services is one of their important tasks, and they also run demonstration-farms and operate logistics centres. These institutions are important bases for education, training and advisory and information services in each region. Developing and providing agricultural education services is the responsibility of the Training and Professional Advisory Service of the Ministry of Agricultural and Rural Development (MARD).

Agricultural schools and university departments cover different aspects of plant breeding and crop genetic resources management. The Research Centre for Agrobotany contributes to the practical training by providing research material and practical demonstrations during short visits to the experimental fields and gene bank facilities.

No specialized course on PGRFA is run in Hungary at present, but some students and PhD students are working on PGR-related thesis projects at the Universities of Debrecen and Gödöllő.

5.3 The national legislation, regulations and policies

Hungary ratified the CBD and proclaimed it in the National Act No. 1995/LXXXI. A ministerial decree (*Ministry of Agriculture Decree No. 92/1997 (XI. 28.)*) was issued on the conservation and utilization of genetic materials on the basis of the authorization provided by the § 29. of the National Act No. 1996/CXXXI on the state registration of plant varieties and the production and certification of seeds and reproductive material with full consideration to the obligations set up in the CBD.

During a general revision of the Hungarian legislation aiming to harmonize it with the EU regulations, both the national act and the ministerial decree were reissued in modified form as *National Act No. 2003/LII and Decree 95/2003 (VIII. 14.)*. The ministerial decree effects every natural and legal person and economic corporation without legal personality that possess gene bank collections approved and registered by the National Plant Gene Bank Council in order to support agriculture, horticulture, forestry and food production and to conserve and utilize biological diversity. It also specifies gene resources among cultivated plants to be preserved as:

- Varieties of Hungarian origin, local variants of Hungarian land races and ecotypes,
- Endangered populations of species in the cultivated flora that are important from the aspects of agriculture, horticulture and forestry (e.g. species that are relatives of cultivated plants, species with value as fodder, medicinal and ornamental species and species that can be utilized in forestry, fruit growing and viticulture),
- Wild relatives of plants cultivated in Hungary which can be utilized for gene transmission by traditional or genetic engineering techniques,
- Species, populations, lines and clones carrying traits that are useful in plant production, breeding and education, as well as for basic and applied research on the cultivated plants in Hungary,
- Gene resources of foreign origin that is not available from other sources and which are important for plant production, plant breeding and education, as well as for diversifying the variety supply in plant production,
- Forest tree species having at least one variety which is either approved by the state or under the procedure of state registration.

According to the decree, the genetic resources can be conserved *in situ* in their original habitats, *ex situ* outside their original habitats, generally in gene bank collections, and *in vitro*, in form of tissue culture.

Hungary signed and joined the FAO International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), and incorporated it into the national legislation system by the *Government Decree No. 358/2004 (XII. 26.)*. The standard Material Transfer Agreement was translated into Hungarian and published in the Official Journal of the Ministry of Agriculture and Rural Development. The legal instruments for the regulation of the implementation of ITPGRFA are under preparation.

The New Hungary Rural Development Plan (UMVP) provides measures for assistance for the preservation of genetic resources. The legal basis for the assistance is provided by *Article 39 Section (5) of Regulation 1698/2005/EC* and *Article 28 and Section 5.3.2.1.4 in Annex II of Regulation 1974/2006/EC* of the European Commission.

The measure is justified as the preservation of the genetic resources in agriculture, in accordance with the Gothenburg declaration, is an activity with priority assistance since it plays a major role in the preservation of the native and the rare species of the fauna and flora.

Purposes of the measure include the preservation of the genetic resources of agriculture, *ex situ* and *in situ*, their characterization, measures for their collection and utilisation, including Internet-based records of genetic resources preserved *in situ* and the *ex situ* collections (gene banks), as well as databases, furthermore, assistance to the information, knowledge, dissemination and consulting activities as well.

The measure will expectedly be announced by end of 2008, and will be open to accept application for financial support in early 2009. The National Gene Bank Council and its specialized working groups will provide technical assistance in the selection procedure.



THE STATE OF THE REGIONAL AND THE INTERNATIONAL COLLABORATION

The establishment of national programmes and participation in regional and international collaboration are equally important because the crop genetic resources, including CWRs are the easiest to preserve in or near their places of origin under isoclimatic conditions, but they can be utilized anywhere within their distribution areas. The international and regional collaboration in the field of conservation and utilization of PGRFA contribute to the global effort to develop sustainable agricultural practices by providing access to a wide range of germplasms preserved in the collaborating countries.

6.1 The regional and the international networks

Hungary participates in the following regional and international collaborations:

6.1.1 European Cooperative Programme for Crop Genetic Resources Networks

The Hungarian PGR programme participates in the European Cooperative Programme for Crop Genetic Resources Networks (ECPGR) since its establishment in 1980²². The RCA has been acting as the national coordinating institute for Hungary. Curators of different collections are members or corresponding members of almost all crop working groups and thematic networks. Hungarian representatives were nominated for almost all groups and provided information for the European Central Crop Data Bases.

Within the frame of the information network, the RCA is responsible for the maintenance of three central crop databases:

- The ECPGR European Central Bromus Database,
- The ECPGR Minor Forage Legumes Database and
- The ECPGR Trifolium pratense Database.

The European Central Bromus Database contains passport data about 678 accessions of 45 *Bromus* species maintained in 13 European gene banks (281 accessions belong to *Bromus inermis*). The collections contain accessions from 37 countries or regions, 8 of them outside Europe, and include cultivars, breeding or research materials, ecotypes or semi-wild material and some material of unknown type. The Bromus database is searchable on-line at the Internet server of NordGen a regional gene bank for Denmark, Finland, Iceland, Norway and Sweden and downloadable from the site of RCA (www.rcat.hu).

The European Database for Minor Forage Legumes includes the passport data of *Anthyllis*, *Astragalus*, *Coronilla*, *Desmodium*, *Dorycnium*, *Lotus*, *Melilotus*, *Onobrychis*, *Ornithopus*, *Physanthyllis*, *Tetragonolobus*, *Trifolium* (except pratense) and *Trigonella* accessions from 12 institutes and gene banks. The total number of accessions is 2 035 originating from 73 countries. At present, the European Minor Forage Legumes Database is available only in downloadable format from the website of RCA.

The elaboration of the ECPGR Trifolium pratense Database started at the Federal Agricultural Research Station of Changins, Nyon, Switzerland, in 1984. After its two editions and final updating, the database was transferred to the RCA in 1995. The Trifolium pratense database is searchable on-line at the Internet server of NordGen, Alnarp, Sweden and downloadable from the site of RCA, too. It contains passport data of 2 833 red clover accessions stored in 21 gene banks or other institutions of 17 European countries.

²² Unk, J. - Holly, L. (1981): A FAO/UNDP európai növényi génbank együttműködési program. Növénytermelés Tom. 30. No. 5: 455-458.



6.1.2 The Plant Genetic Resources Information System (EPGRIS, EURISCO)

The EURISCO, as a web-based catalogue provides information on more than one million accessions held in the European *ex situ* collections. It is accessible since the end of 2003. Part of the Hungarian National Inventory (HNI) was uploaded among the first contributions in August 2003, with passport information of 42 085 accessions belonging to 253 genera and 804 species. The last update of the data took place in 30th November 2007, and the revised dataset contains information about 45 321 accessions of 915 species (294 genera).

6.1.3 Conservation of Crop Wild Relatives (PGR Forum)

PGR Forum is a European Network forum for the assessment of taxonomic and genetic diversity of European crop wild relatives and the development of appropriate conservation methodologies. PGR Forum's main goal is to build an information system providing access to data about European crop wild relatives. One of the primary goals of PGR Forum was a conservation gap analysis and recommendations for *in situ* and *ex situ* conservation of European crop wild relatives. The development of methodologies, particularly for *in situ* conservation was also a major component of the project. The Hungarian PGR programme scientists participated in some activities of the PGR Forum, and submitted several publications concerning CWR conservation.^{23,24,25,26}

6.1.4 On-farm Conservation Network

The RCA has always paid special attention to the collection and maintenance of native land races of field and vegetable crops. A back-yard multiplication system was developed and used for the isoclimatic regeneration of land races near the places of their collecting sites²⁷.

In 2001–2003, the Institute for Agrobotany (RCA) in co-operation with the Institute of Environmental Management of “Szent István” University participated in the global project of the International Plant Genetic Resources Institute (IPGRI) to assess the importance of small-scale farms and home gardens in conserving agricultural biodiversity. A household survey was conducted in three pilot sites, each of them located in Environmentally Sensitive Areas (ESAs), where previous collection missions of the Institute for Agrobotany have explored and collected a number of local landraces. The system of Environmentally Sensitive Areas is a part of the National Agri-Environment Programme (NAEP) in Hungary. Under ESA system, several areas of Hungary with low agricultural productivity but high environmental value are designated as environmentally sensitive areas, where the promotion of conservation subsidized by direct payments, training programmes and technical assistance provided to the farmers, who are willing to use specified, environmentally friendly farming methods.

In addition to the socio-economic studies, the household survey was also used to assess species composition, variety's and home gardens' diversity in the targeted areas. The results were published in papers and oral presentations.^{28,29,30,31,32,33,34}

²³ Holly L., Vörösváry G., Horváth L., (2005): *Ex situ* conservation of crop wild relatives in Hungary. First International Conference on Crop Wild Relative Conservation and Use, 14 – 17 September 2005, Agrigento, Sicily, Italy, Book of abstracts, p. 80.

²⁴ Vörösváry G., Holly L., Horváth L., (2005): Conservation priorities for crop wild relatives in Hungary. First International Conference on Crop Wild Relative Conservation and Use, 14 – 17 September 2005, Agrigento, Sicily, Italy, Book of abstracts, p. 28.

²⁵ Vörösváry, G., Hauptvogel, P., Málnási Csizmadia, G., Baranec, T., Holly, L., Drobná, J., Benková, M., (2006): Collecting crop genetic resources in different regions of Hungary, 2006 Zborník z 13. vedeckej konferencie 14-15 november 2006. p. 198-200. Výskumný ústav rastlinnej výroby Piešťany.

²⁶ Holly, L., Vörösváry, G., Horváth, L. (2005): *Ex situ* conservation of crop wild relatives in Hungary. Genofond 9. p.77. Výskumný ústav rastlinnej výroby Piešťany.

²⁷ Holly, L. - Unk, J. (1981): Preservation of Hungarian land-races as genetic resources. Kulturpflanze XXIX: 63-65.

²⁸ Holly László – Gyovai Ágnes – Már István – Málnási Csizmadia Gábor – Horváth Lajos – Kollár Zsuzsanna (2002): Az ökológiailag érzékeny területek lehetséges szerepe az agro-biodiverzitás megőrzésében. Acta Agronomica Hungarica. Magyar Tudományos Akadémia Mezőgazdasági Kutatóintézete. Martonvásár. 145-155 pp.

²⁹ Ágnes Gyovai (2002): The economics of conserving agricultural biodiversity on-farm. In: Melinda Smale – István Már – Devra I. Jarvis (ed.) (2002): Proceedings of a Workshop. Hosted by the Institute for Agrobotany (IA, Hungary) and the International Plant Genetic Resources Institute (IPGRI, Italy). Gödöllő – Hungary. 44-47. pp.

³⁰ Ekin Biro – Ágnes Gyovai (2003): The value of agricultural Biodiversity in Hungarian Home Gardens: Agri-environmental policies in a Transitional Economy. 4th BIOECON Workshop, Venice International University.

³¹ Bela Györgyi – Gyovai Ágnes (2002): The Economics of Conserving Crop Genetic Resources on-farms. 2nd International Conference for Young Researchers of Economics, Gödöllő. II. kötet 33-36. pp.

³² Gyovai Ágnes – M. Csizmadia Gábor (2003): Gardening and crop species composition in Dévaványa ESA. Ph.D. hallgatók IV. Nemzetközi Konferenciájára. Miskolc. 271-274. pp.

³³ Ekin Biro – Melinda Smale – Ágnes Gyovai (2004): Sustainable Use and Management of Crop Genetic Resources: Landraces on Hungarian Small Farms. Thirteenth annual conference of European Association of Environmental and Resource Economists. Budapest.

³⁴ Ekin Biro – Melinda Smale – Ágnes Gyovai (2004): Managing Agricultural Biodiversity in a Transitional Economy: An Analysis of Hungarian Family Farms. IFPRI Workshop on Valuing the Biological Diversity of Crops in a Development Context, Rome

6.1.5 World Information and Early Warning System

The World Information and Early Warning System (WIEWS) on PGRFA is a worldwide dynamic mechanism developed by FAO for maintaining and providing worldwide information concerning the status of PGRFA collections. RCA coordinates the contributions from the collection-holding Hungarian institutions in order to assist in achieving the main goals of WIEWS.

6.1.6 Bilateral scientific and technological (S&T) cooperation programmes

Within the frame of a bilateral scientific and technological (S&T) cooperation programme between Slovakia and Hungary a collaborative project was conducted on (Table 20): “*Mapping and collection genetic diversity of plant genetic resources in the Great Hungarian Plain and Transdanubia for 2005-2006*”. (Research project number: TÉT SK-15/2004).

In another bilateral scientific and technological (S&T) cooperation programme between Romania and Hungary, a joint project was developed and started in 2008. The project entitled for (Table 21): “*Diversity assessment and collecting of plant genetic resources in the North-eastern Carpathian Mountains and Békés regions for 2008-2009*”. (Research project number: TÉT RO-41/2007).

TABLE 20

Number of accessions collected during the joint collecting missions with Slovakia (2005-2006)

Crop groups	Crops		Wild relatives	
	SVK	HUN	SVK	HUN
Cereals	7	46	14	4
Vegetables	2	96	3	5
Tubers	2	13		
Medicinal plants	1	13	17	4
Pulses	12	122		
Grasses			21	3
Forage legumes			21	16
Condiments		2		
Oil plants			6	1
Fruits				1
Ornamentals		2	4	1
Total	24	294	87	34

TABLE 21

Number of accessions collected during the joint collecting missions with Romania (2008)

Crop groups	Crops		Wild relatives	
	ROM	HUN	ROM	HUN
Cereals		10		10
Vegetables	12	88	8	14
Tubers		5		
Medicinal plants		5	11	34
Pulses	1	32		3
Grasses			4	3
Forage legumes			18	5
Condiments		8		
Oil plants				
Fruits		4		
Ornamentals		7	18	8
Total	13	159	59	77

6.2 International Agreements

Hungary ratified the Convention on Biological Diversity (CBD) in 1995 (*National Act No. LXXXI. of 1995*). A delegation attended the Leipzig meeting and accepted the Leipzig Declaration and the Global Plan of Action in 1996. Hungary is a member of the FAO Commission on Plant Genetic Resources, and joined the FAO International Treaty on Plant Genetic Resources for Food and Agriculture. Hungary adopted the Treaty by a *Government's Decree (No. 358/2004. XII. 26.)*. The standard Material Transfer Agreement was translated into Hungarian and published in the Official Journal of the Ministry of Agriculture and Rural Development in 2008. The legislation required for the full implementation of the Treaty and the participation in the Multilateral System of Access and Benefit Sharing is being considered and developed by the Ministry of Agriculture and Rural Development in collaboration with the Ministry of Environment and Water.



ACCESS TO PGR AND SHARING OF BENEFITS, AND FARMERS' RIGHTS

The PGRFA accessions are maintained and preserved either *in situ* or *ex situ* in Hungary as it was discussed in the previous chapters. According to the national laws and regulations on access to PGRFA and benefit sharing depend on the status of plant genetic resources collections.

7.1 Access to plant genetic resources

Hungary is already a Contracting Party of the International Treaty on Plant Genetic Resources for Food and Agriculture and the Multilateral System of Access and Benefit-sharing to be developed under the aegis of the Treaty for the Annex 1. crops.

Implementation of the Treaty and the Multilateral System to bring relevant PGRFA collections under the umbrella of the Multilateral System is under way in Hungary. It is subject to the survey on the updating of existing PGRFA collections and to the long-term funding mechanism required for the long-term maintenance of the state-registered PGRFA collections. Hungary, as a member of the European Union, participates in the ongoing negotiation concerning the implementation of the Multilateral System, the establishment of a European integrated PGR conservation system (AEGIS) and the utilization of EURISCO as a vehicle to provide and update information on germplasms put under the MS.

During the last years breeders and universities experienced occasionally difficulties in obtaining PGRFA samples from genetic resources collections. Public PGR centres, like RCAT did not faced any difficulties in obtaining samples from institutions involved in the regional PGR programme (ECPGR).

7.2 Farmers' rights

For the first time in any binding international instrument, the International Treaty on Plant Genetic Resources for Food and Agriculture makes provision, in Article 9, for countries to realize Farmers' Rights, through three ways. Hungary has not completed Farmers' Rights neither in the protection of traditional knowledge relevant to PGRFA nor in the right to participate in making national decisions regarding the conservation and sustainable use of PGRFA nor in the right to equitably participate in sharing benefits from the utilization of PGRFA. It appears that the development of the civil sector and the increasing interests of NGOs in on-farm and *ex situ* conservation of PGRFA will assist in the introduction of Farmers' Rights measures in Hungary.

