

**Fourth National Report  
on the Implementation  
of the Convention on Biological Diversity**

**POLAND**

Ministry of the Environment

Warsaw, March 2009

## **Contents:**

<b>1. EXECUTIVE SUMMARY.....</b>	<b>4</b>
<b>2. OVERVIEW OF BIODIVERSITY STATUS, TRENDS AND THREATS .....</b>	<b>12</b>
<b>3. CURRENT STATUS OF NATIONAL BIODIVERSITY STRATEGIES AND ACTION PLANS.....</b>	<b>39</b>
3.1 Identification and monitoring of the state of biological diversity and existing and potential threats .....	42
3.2 Effective elimination or reduction in threats to biological diversity.....	45
3.3 Preservation and/or improvement of existing as well as restoration of lost components of biodiversity.....	55
3.4 Complete integration of the actions aimed at the biological diversity conservation with the sectors of economy influencing this diversity as well as the public administration and the society (including non-governmental organisations) with keeping proper proportions between the environmental balance and the social and economic development of the country .....	78
3.5 Broadening the knowledge and shaping attitudes and social activity on the protection and sustainable use of biological diversity .....	81
3.6 Improvement of the mechanisms and instruments supporting conservation and sustainable use of biological diversity .....	85
3.7 Development of international cooperation on a regional and global scale for protection and sustainable use of biological diversity resources .....	100
3.8 Sustainable use of biological diversity taking into account fair and equitable sharing of benefits and costs, including costs of abandoning development due to natural resource protection.....	103
<b>4.SECTORAL AND CROSS-SECTORAL INTEGRATION OR MAINSTREAMING OF BIODIVERSITY CONSIDERATIONS .....</b>	<b>104</b>
4.1 Forest management.....	104
4.2 Agriculture .....	109
4.3 Fishery.....	113
4.4 Tourism .....	116
<b>5. CONCLUSIONS: PROGRESS TOWARDS THE 2010 TARGET AND IMPLEMENTATION OF THE STRATEGIC PLAN .....</b>	<b>119</b>
5.1 Progress towards The 2010 Target .....	119
5.2 Progress towards the goals and objectives of the Strategic Plan of the Convention ....	133

**Appendices:**

- 1. INFORMATION CONCERNING THE REPORTING PARTY AND PREPARATION OF NATIONAL REPORT**
- 2. PROGRESS TOWARDS TARGETS OF THE GLOBAL STRATEGY FOR PLANT CONSERVATION**
- 3. PROGRESS TOWARDS TARGETS OF THE PROGRAMME OF WORK ON PROTECTED AREAS**

## 1. EXECUTIVE SUMMARY

Biological diversity in Poland is rather well known. It is estimated, that the total number of species occurring within the territory of Poland is about 63 thousand, including approximately 28 thousand plant species and 35 thousand animal species (700 vertebrate species). There are 485 plant communities in Poland (identified using Braun-Blanquet method), which appropriately describe the whole biological diversity of plant communities in terrestrial, aquatic and marine ecosystems.

Threats to biological diversity present in Poland are typical of contemporary civilization: progressing urbanisation and land management, too slow reduction in pollution of environmental elements, adverse changes in land use, adverse impact on species perceived as conflicting, overexploitation of certain wild populations, progressing fauna and flora synanthropization and inflow of alien species. Genetic modifications of species and their release into the environment have been a potential threat in recent years and remain insufficiently explored. The political and economic transformation after 1989 aggravated threats to biological diversity (free market economy, more investment in new areas, opening borders, growing consumption, etc.).

As a result of anthropogenic pressure, sixteen vertebrate species, including 10 bird species, 4 mammal species, one fish and one reptile species, have disappeared or gone extinct in the territory of Poland, and 60% of them have vanished within last 40 years. According to the *Polish Red Book* (2001), the list of endangered vertebrate species is 111 items long. Declining trends are recorded for 1648 plant species, 29% of which are vulnerable lichen, 20% - liverworts and basidiomycete fungi, 18% - moss, and 15% - vascular plants. It is estimated that 124 plant species have gone extinct or retreated over last 200 years. The *Polish Red Book of Plants* (2001) listing endangered ferns and flowering plants currently comprises 296 taxa, that is, 15% of the whole Polish flora. Thirty eight of those have lost their natural habitats in Poland<sup>1</sup>. However, unlike to other European countries, Poland's farmland is characterised by a rich mosaic of habitats resultant from the traditional forms of farming. A substantial part of agricultural land is of high natural value and functions as a safe harbour for many endangered flora and fauna species. Owing to fragmentation of agricultural land, local forms of crop plants and local livestock breeds have survived until now in Poland. Abundance of old plant species can be found particularly in southern and eastern parts of the country (The Beskidy and Tatra Mountains, Poniżanie, and

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<sup>1</sup> *Red List of Threatened Animals in Poland* (Głowaciński 2002) contains 2769 species in total, which includes 7% of national fauna. 2174 items on the list are insects, 286 – arachnida, 151 – vertebrate, 129 – molluscs, and 30 – other animal groups. Most threatened groups include molluscs (almost 50% of all the species recorded in Poland were on the list), aquatic (57%) and terrestrial (43%) snails and slugs, ants (57%), bees (47%), mayflies (45%), Orthoptera (40%), mammals (33%), and birds (31%). Summing up, 707 of the listed invertebrate species are extinct species, critically endangered species and strongly endangered species, while the number of endangered vertebrate species is 62.

*Red List of Plants and Fungi in Poland* (Zarzycki K., Mirek Z., 2006) includes 3123 taxons in total, including 506 vascular plant species, 92 liverwort and hornwort species, 963 fungi, 594 algae, 886 lichen and 82 myxomycetes species. Out of all the listed vascular plants, the highest endangerment level (extinct and vanished and vanishing species) characterizes 101 taxa, in case of liverworts and hornworts it is 39, and for fungi – 653 taxa.

Lubelszczyzna). However, the progressing modernization of Polish agriculture, discontinued cultivation of large light-soil areas and common availability of modern seeding material of crop species pose a threat to local populations and old species of crops. The majority of animal species bred in the country belong to not much more than a dozen of breeds, and the diversity is the largest in the case of sheep: there are 32 different breeds and lines kept. Apart from many valuable indigenous livestock breeds, fur animal varieties, local varieties of Central-European breed of bees, lines of carp and strains of trout deserve special attention.

In recent years a number of policy documents have been issued; they clearly indicate the need for conservation of Poland's natural heritage. Most important include *National Environmental Policy* of 1991 and its continuation for subsequent planning periods (*II National Environmental Policy* of 2001, *National Environmental Policy for 2003-2006 including Perspectives for Years 2007-2010*, the *National Environmental Policy for 2009-2012 including Perspectives till Year 2016* draft adopted by the Council of Ministers in December 2008). Other strategic documents were also adopted. Their implementation should ensure favourable environment for actions taken under biological diversity conservation programmes. They include: *Poland 2025: Long-term Strategy for Sustainable Development* (2000), *National Strategy for Environmental Education: through Education to Sustainable Development* (2000), *National Spatial Development Policy Concept* (1999), *National Forest Policy* (1997), *Coherent Structural Policy for Development of Rural Areas and Agriculture* (1999), *National Development Strategy 2007-2015*, *National Strategic Plan for Development of Rural Areas*, *National Strategic Reference Framework (National Cohesion Strategy 2007-2013)*, *Operational Program: Infrastructure and Environment, Conservation Strategy for Protection of Wetlands* (2006).

Of all the policy documents adopted for implementation, most important in nature protection terms are strategies for conservation and sustainable use of biological diversity and the resultant action plans. The first document of the type, adopted by the Council of Ministers on 25 February 2004, included formulation of 4 strategic objectives (activities) and 57 operational objectives (activities) that were elaborated in the *Action Plan* into 95 activities for years 2003-2006. However, since the *National Strategy* came in force in 2003, the nature conservation situation has significantly changed, mainly as a result of Poland's accession to the European Union, but also due to social and economic changes. Thus, it was necessary not only to develop a new *Action Plan* for the next period but also to verify and update the strategy provisions. The amended version was adopted by the Council of Ministers on 26 October 2007. As a result of the verification, the wording of the primary objective was extended with an emphasis on biological diversity conservation, which should respect Poland's social and economic development needs and ensure proper living and social development conditions. Four additional strategic goals were formulated. They addressed international cooperation, education, use of biological diversity and improvement of nature protection mechanisms and instruments. Attaining all the eight strategic goals will require achieving 77 verified and amended operational objectives set for 17 state administration sectors. The *Action Plan for Years 2007-2013* stipulated 134 tasks, each with detailed executive requirements. Those included both activities carried over in the previous period and new tasks stemming from the current international obligations and national needs. The current document stipulates that all the activities in all the fields (economic, research and development, legal, and educational) should support the ultimate objective, namely: **To preserve biological diversity on a local, national, and global scale and to ensure sustainability and development at all**

**organizational levels (within species, between species and at the higher than species level) with respect to Poland's social and economic development needs and ensuring proper living and social development conditions.**

Attaining the supreme goal requires achieving eight strategic goals of equal priority:

- to identify and monitor the state of biological diversity and existing and potential threats;
- to eliminate or limit threats to biological diversity more effectively;
- to preserve and/or enrich the existing and restore lost biological diversity components;
- to fully integrate biological diversity conservation activities with economic, administrative and social (including NGO's) activities that impact it, while observing the right proportions between national environmental protection and social and economic development;
- to promote social awareness and foster attitudes and activities supporting conservation and sustainable use of biological diversity;
- to improve mechanisms and instruments supporting conservation and sustainable use of biological diversity;
- to foster international cooperation on a regional and global scale for conservation and sustainable use of biological diversity;
- to use biological diversity in a sustainable manner and with respect to fair and equitable distribution of benefits and costs of its conservation, including cost of desisting from development activities for protection of natural resources.

The strategic goals and the operational objectives formulated in the *Strategy* as well as the tasks from *Action Plan* fully incorporate the needs specified in the Convention on Biological Diversity and its Strategic Plan. They also refer to the 2010 Target and Millennium Development Goals.

Poland has good and long traditions of nature conservation. The first act on nature protection was adopted in 1934 and its successive versions - in 1949 and 1991 (all of them successively amended). Poland's accession to the European Union and the necessity of updating Polish principles of nature conservation and adapting them to the EU requirements led to passing a new *Act on Nature Conservation*, which expands or updates earlier provisions concerning conservation of natural resources: areas, natural sites and plant, animal or fungi species. Among others, the Act imposes developing protection programmes for particularly rare and vulnerable species, regulates trade in vulnerable species on a domestic and international scale, defines functioning and tasks of botanical and zoological gardens, including the ones related to *ex situ* conservation of rare and vulnerable species, specifies responsibility ranges for nature conservation authorities, states the mode and extent of developing management plans of national parks, nature reserves and landscape parks, and stipulates penal regulations for failure to observe nature conservation law. On 3 October 2008, Polish Parliament passed an extensive amendment of the law. Its purpose was to, among others, support complete incorporation of EU regulations into Polish laws, improve management of Natura 2000 sites, and ensure proper supervision by bodies that make

decisions regarding limitations of natural environment use. It clarified such issues as the manner of supervising and managing Natura 2000 sites, extension of the scope of monitoring natural environment components in Natura 2000 sites and conditions for environmental compensations. It also introduced new conservation tools for Natura 2000 sites (so-called plans of conservation tasks), specified, in more detail, the manner of establishing and deletion Natura 2000 sites, and added “areas of importance to the Community” category to Natura 2000. Another issue that was significantly extended was the obligation of social consultations with relevant involved stakeholders during preparation of both protective tasks plan and management plans. In terms of species protection, the amended law limited options of introducing derogations from bans for protected animal species to only the cases stipulated in the Bird Directive and Habitat Directive of EU.

New solutions for organization of environmental protection authorities were introduced by the Act (dated 3 October 2008) on Sharing Information on the Environment and its Protection, Involvement of Society in Nature Conservation and on Environmental Impact Assessments. The changes introduced resulted from an analysis of lessons learnt while implementing the system of environmental impact assessment and managing protected areas, especially Natura 2000 sites. The main change was establishing specialized environmental protection services within state administration at the central and regional level. The services are headed by General Director for Environmental Protection as the central state administration body reporting to the minister in charge of environmental protection. At the regional level (covering individual voivodships or provinces), those are regional directors for environmental protection, non-consolidated state administration authorities. The competence of the new bodies combines issues related to undertakings’ environmental impact assessment with managing nature protection, including the European Ecological Network Natura 2000 and with responsibility for environmental damages. Currently, there are legislative works carried out on further changes regarding organizational subordination of some nature protection forms (such as landscape parks) to local government authorities.

In practice, biological diversity conservation provides designation of networks of protected areas and objects in Poland. The most valuable areas in terms of nature protection (as reported at the end of 2007) were covered by protection in 23 national parks (area of 317 405 ha), 1 423 nature reserves (168 797 ha), 120 landscape parks (2 517 183 ha) and 412 protected landscape areas (7 047 537 ha). Other forms of nature protection are: ecological sites – 6,686 sites of the total area of 46 135 ha, documentation sites – 153 sites of the total area of 780 ha, nature and landscape complexes – 207 sites of the total area of 93 510 ha, and natural monuments – 35 074 objects. In total, all the forms of environmental protection have covered over 32% of the whole area of the country. Irrespectively of the above, within *National Program of Preparations for Membership in the European Union*, in January 2000 Poland joined the European Ecological Network Natura 2000, the main objective of which is to create a system of effective protection of natural habitats and species significant on the European Continent scale. Joining the European Union, Poland assumed the obligation to present a list of areas that would be included in the network pursuant to the Habitats Directive and Birds Directive. From 2004 to 2008, Poland successively sent relevant proposals to the European Commission; it extended the list (as of the end of 2008) with 364 special areas for habitat conservation SAC (covering 8,37% of the whole

country) and 141 special bird protection areas SPA (covering 15,97% of the country). Seven of the requested areas are areas of both special bird protection and special habitat protection. Therefore, Poland submitted in total 498 Natura 2000 sites that cover 18,23% of the territory of Poland.

The attempts made by the government administration for improvement of the nature status and supported by social activity, contribute to gradual, although still relatively too slow, elimination of existing threats and unfavourable changes in the environment. The progress in the field made over last 5 years is owed to a host of organizational, legal, technical, and other activities, out of which the following deserve special attention:

- launching, as a part of the State Environmental Monitoring System, two following monitoring programs adjusted to Habitats and Birds Directives: (1) monitoring of species and natural habitats, covering, among others, all the species and natural habitats that are priorities to the European Community, including assessment of their status of conservation, and (2) monitoring of birds, covering, in total, 11 subprograms for nesting species;
- enhancement of the knowledge on biological diversity of natural environment in result of detailed inventory works carried out in selected regions of the country;
- gradual improvement in the quality of waters and atmosphere in result of creating conditions that support limiting of anthropogenic impact upon environment;
- increasing the number and area of legally protected sites due to their high natural value, including reserves (2000: 1307, 2007: 1423), documentation sites (2000: 103, 2007: 153), ecological sites (2000: 6113, 2007: 6686) and nature and landscape complexes (2000: 170, 2007: 207);
- increasing the number of natural monuments (2000: 33094, 2007: 35074);
- establishing 141 special protection areas of the Natura 2000 network;
- developing and submitting for the European Commission's approval proposals for 364 special areas of conservation of Natura 2000 network (considered "areas of importance to the Community" under the Decision of the European Commission dated 12 December 2008);
- developing and implementing new regulations regarding wild plants, fungi and animals, and taking into consideration other manners of protecting their habitats, sites, and shelters;
- growing gradually, according to financial capacity and needs, genetic resources of plants and animals in gene banks and collections of botanical, zoological gardens, and arboreta;
- extending programs for restitution and reintroduction of particularly threatened plant and animal species;
- developing a project on new regulations regarding approach to genetically modified organisms and defining, among others, conditions for contained use of GMO's, deliberated release to environment, placing GMO on the market and sharing information on GMO's, and clarifying the scope of duties of inspection services;



*Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

- clarification, according to the amendment dated 3 October 2008 to Act on Nature Conservation, principles of handling alien species;
- increasing the effectiveness of preventing international trade in wild populations of endangered animals and plants through launching an extensive campaign of training police force and customs officers;
- intensification of actions for growing ecological knowledge and awareness of society;
- implementing new solutions for organization of environmental protection authorities, consisting in establishing special state administration services at the central and regional level, whose competence would include issues related to assessment of specific actions' impact upon environment, nature protection, including Natura 2000 network, and responsibility for environmental damage;
- capacity building for much broader involvement of public in environmental protection decision making procedures;
- clarifying the requirements regarding development of environmental impact assessments for planned undertakings;
- implementing new financial mechanisms targeted at providing support for environmental projects and programmes, including LIFE+ Financial Instrument and Operational Program Infrastructure and Environment – Priority V;
- continued implementation of environmental technology of forest cultivation on a greater and greater scale;
- implementing agro-environmental schemes stimulating pro-ecological activities in agricultural regions and supporting protection of genetic resources for food sector and agriculture;
- enabling environment supporting fast development of organic farming that would result in increasing the type of farms five times in years 2004-2007.

Despite achieving significant results, the actions taken for nature conservation so far are still not completely satisfactory. The instruments used for implementing the biological diversity conservation tasks require constant strengthening (staff, financial means) and improvement (law, organizational structures). It is also necessary to keep increasing integration of conservation measures with preventive activities for which, first of all, economic sectors should be responsible. More and more difficult conflicts appear where nature protection needs cross social and economic development, especially when it comes to implementation of Natura 2000 network (e.g. the necessary development of transportation networks more and more often faces difficulties with getting adjusted to the extensive system of areas covered by various forms of legal protection). Local conflicts are also generated by introducing bans and restrictions obligatory for national and landscape parks and their buffer zones. Naturalists and hydro-technicians are still not unanimous about management of river beds and valleys in a way that would reconcile the needs for flood control, water retention and hydro power engineering with conservation of most valuable natural habitats. Developing solutions satisfactory to all

stakeholders is a difficult process and reaching the consensus requires a considerable dose of good will.

Summing up, the particularly significant problems, solving of which is a prerequisite to further progress of actions for biological diversity conservation include:

- high degradation of natural environment in areas previously and / or currently subject to strong human impact;
- reported decreasing of biological diversity in areas intensively exploited in economic terms;
- insufficient knowledge of the natural value of those parts of the country that are not covered by any form of nature protection or inventory works. Particularly little is known about natural values of marine areas;
- some areas of high natural value remain outside the conservation system. A lack of sufficient instruments for preserving biological diversity outside protected areas. Lacking legal basis for ecological corridors. Weak conservation regime of protected landscape sites. Difficulties in obtaining social approval for establishing new or extending existing protected areas, including Natura 2000 sites and national parks (for instance, Jurajski, Turnicki, and Mazurski NPs and extending Białowieża NP);
- too low number of approved protected area management plans and problems with their implementation;
- insufficient means for development of nature research, thus, for growing the scientific potential;
- too slow increasing of environmental awareness of a part of society. Position of nature protection issues too weak with politicians and civil servants;
- insufficient execution of nature protection requirements in the spatial planning system;
- insufficient consideration of nature protection issues in sectoral policies, strategies and programs as well as in other supporting documents (e.g. best practice codes). Lack of practical guides regarding methods of sustainable use of biological diversity (in various fields);
- insufficient knowledge of the impact of certain civilisation factors and global changes on biological diversity;
- insufficient popularization of advisory and trainings in agro-environmental activities for farmers and fishermen and the resultant little interest showed by the social groups;
- lack of mechanisms supporting actions for improving profitability of use of domestic breeds and lines of domestic animals, lack of a national genes bank for animal genetic resources;
- lack of national laws regulating protection and use of plant genetic resources;
- too low number of species covered by programmes for restitution and reintroduction of species. Scopes of actions taken for their implementation too limited;

*Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

- insufficient, compared to the needs, substantive scope of nature monitoring. Lack of established and implemented mechanisms of using the monitoring data aggregated by science institutions and NGO's;
- insufficient promotion of guides for protection of natural habitats and species protected pursuant to the Habitats Directive and Birds Directive. A lack of guidelines for protection of some habitats;
- the progress in extending general-access online data bases on biological diversity too slow;
- the provisions regarding nature protection programmes in forest districts too general (also in case of guidelines). Insufficient alignment of nature protection needs with economic activities planned in forest districts;
- insufficient natural research of areas designated for afforestation, thus, a risk of damaging valuable natural habitats and species habitats. Lack of programmes for growing forest cover in most voivodships;
- insufficient, compared to the responsibilities and tasks, funds for operation of nature protection authorities and insufficient manpower allocation;
- a lack of commonly used methods of assessing and evaluating biological diversity;
- insufficiently effective execution of law;
- insufficient consideration of biological diversity protection needs in private forests.

It is assumed that many of the above problems will be eliminated or limited by execution of the tasks specified in *Action Plan for Years 2007-2013* which elaborates provisions of *National Strategy for Conservation and Sustainable Use of Biological Diversity* adopted by the Council of Ministers of RP on 26 October 2007.

## **2. OVERVIEW OF BIODIVERSITY STATUS, TRENDS AND THREATS**

Poland is one of the countries with high natural diversity. Biodiversity in this climatic zone is one of the richest in Europe. This is determined by features of transitional climate influenced by oceanic and continental air masses, favourable conditions of the geographic location in the central part of the continent, without natural barriers in the East and in the West, diversified geological structure, diversified land relief and the hydrographic system, variability of soil substratum. Natural richness of Poland was also determined by different conditions of economic and civilization development as compared to other European countries: uneven industrialization and urbanization of the country, traditional, extensive agriculture preserved over relatively large areas, as well as vast and historically sustainable forests (the Białowieża Forest is the best preserved natural forest in Europe). This picture, however, is regionally diverse. There are regions with well-preserved nature (e.g. the north-eastern part of the country called the *Green Lungs of Poland*), where certain species occur in relatively large numbers, whereas in other parts of Europe they are endangered or extinct. There are regions, however, where degradation of nature and impoverishment of species composition proceeds (e.g. industrialized and urbanized Upper Silesia). Diversification of natural resources in particular regions, which results from transitional character of the climate and latitudinal layout of land relief brings about the fact that many northern, southern, western and eastern boundaries of miscellaneous species occurrence run throughout Poland. At the same time, the lack of natural geographical barriers and continuity of habitats in the latitudinal layout brought about the situation that flora and fauna in the lowland part of Poland is poor in endemic species, which occur mainly in mountain areas and are territorially connected with the mountain ranges of the Carpathians and the Sudetes.

Diversification of physical, geographical and biogeographical features of Poland, as well as miscellaneous land use forms determine the diversity of vegetation cover.

The diversity of vegetation cover can be described according to various criteria. In Poland, the phytosociological system according to Braun-Blanquet is commonly applied. According to this approach, the main typological units of vegetation, that is **plant communities** are identified based on species composition (i.e. according to the floristic criterion). At the same time, every plant association defines vegetation patches (**phytocoenoses**) with certain properties, such as peculiar physiognomy, resulting from the contribution of plants with specific habit and life form; internal spatial structure, both horizontal and vertical, above-ground and underground; specific seasonal rhythm and regeneration dynamics; specific energy flow and ecological productivity; specific diversity expressed as a number of species forming a phytocoenosis. All such properties are used as features characterizing the identified plant communities. From this perspective, a plant association also defines a certain, specific ecosystem type. Plant communities can be grouped (classified) into systematic units of higher and higher rank, so each of them would have **characteristic species** (that is species particularly constant to a given group of communities) with broader and broader ecological amplitude. With such an approach, **the class of communities** is the highest systematic unit in the vegetation classification.

Depending on the needs (especially for the description and characteristics of vegetation in particular areas), classes can be grouped according to physiognomic, practical or habitat criteria.

For the sake of this report, the division into a few groups of physiognomic and ecological character was accepted, which comprises classes included in the study of W. Matuszkiewicz (2001).

### **Forest and thicket communities**

Thicket communities (Class *Rhamno-Prunetea*). The class includes at least 6 associations. Those are shrub communities, which in natural conditions occur along forest edges, in fresh and not particularly poor habitats. Whereas, secondarily they are encountered on baulks or along roads in the form of clumps, strips or semi-natural hedges. With specific forestry, they can also constitute a degeneration or regeneration phase of a forest community. Among the major component species of those communities there are: blackthorn and in the southern part of the country - barberry, privet, dogwood and numerous rose species. They are spread all over Poland, not thoroughly investigated yet. No long-term trends have been observed in transformations of the composition and distribution of those communities, whereas during shorter periods the surface area of communities increases as a consequence of the increased area of lain fallow fields and decreases with intensification of agriculture.

Willow-poplar riparian forests (Class *Salicetea purpureae*). The class includes 4 associations. Those are associations of riverine forests and thickets, occurring in valleys of big rivers on sandy alluvia (only one thicket association is connected with gravel banks and heaps of Carpathian (mountain streams)). They are mainly composed of different willow and poplar species. In the case of embanked rivers, they occur in the inter-embankment zone, within reach of periodic high water levels. In the past, lowland poplar-willow riverine forests commonly occurred in valleys of bigger rivers; at present they occur only on small areas, mainly on the Vistula, Bug and Narwia Rivers, in the valley of the middle Warta River and on the Lower Odra River. At present, well-developed patches are relatively rare. The occurrence of poplar-willow riverine forests is endangered by flood-control technical activities in river valleys. A regular trend has been observed all over Poland towards decreasing the surface area covered by those communities.

Alder woods (Class *Antae glutinosus*). The class includes 7 associations. Those are swamp forests dominated by or with high contribution of black alder (*Alnus glutinosa*) and downy birch (*Betula pubescens*), commonly called alder woods, as well as preceding in the succession series - thickets of broad-leaved willows with some contribution of alder. The occurrence of alder habitats is conditioned by specific water balance, characterized by strong vertical movements of subterranean waters, which in the spring cover the surface of the area and during dry periods fluctuate at a depth of several dozen centimetres. Particular associations from this class are characterized by different geographical distribution. One thicket association occurs on the coast of the Baltic Sea, three associations are found in north-eastern Poland, and the remaining ones are common all over the country. Due to the general process of lowering the ground water level, the extinction of suitable alder habitats has been observed, strong over the last decades and less intensive at present, as well as the decrease of surface area of individual forest phytocoenoses. This process does not involve the class' thicket communities, which in some places are in expansion and cover sites of dried up sedge communities.

Relict pine forests (Class *Erico-Pinetea*), represented by 2 associations. From the all-European perspective this class includes numerous associations of pine forests, occurring in southern

Europe on dry substratum with high content of calcium carbonate. In the territory of Poland this class includes clearly relict, saxicolous pine forests of natural origin, occurring on few locations in the Pieniny Mountains. At present, no evident transformation trends are being observed, or special threats to the existence of those communities, although most probably in the long-term they are threatened with extinction.

Communities of coniferous and mixed coniferous forests (Class *Vaccinio-Piceetea*). The class includes 22 associations. Those are pine forests (coniferous forests), spruce and spruce together with fir, occurring on acid and poor habitats characterised by significant contribution of dwarf shrubs and the occurrence of numerous species of mosses and lichens. In general terms, those communities take on boreal-mountain character. In each group of coniferous forests (pine, spruce and spruce-fir), the variability has been observed, consistent with geographical, humidity and fertility gradients, while this diversification is most intensely expressed in the case of pine forests. Geographic variability is manifested by the occurrence of three regional associations of pine forests: coastal, suboceanic and subcontinental. According to the humidity gradient, dry, fresh, moist and marshy pine forests are distinguished, whereas the fertility gradient is reflected by the occurrence of typical pine forests and mixed pine-oak forests. Forest associations from this class cover most of the forest area in the country and constitute the important object of business activity. Also for this reason, most of the phytocoenoses demonstrates different stadia of structure degradation, consisting mainly in rejuvenation (age-decrease). Different communities within the class demonstrate different dynamic values. Undoubtedly, there has been observed a trend towards extinction of lichen Scots pine forests, and less apparent decrease of the subcontinental pine forest's range, as well as spreading of suboceanic and mixed coniferous forests. Pine bog woods, spruce forests on peat and moist coniferous forests could be threatened by changes in hydrographic conditions leading to xericity of habitats.

Acidophilous oak forests. Class *Quercetea robori-petraeae*. The class includes 6 associations. Those are acidophilous forests dominated by oak trees, occurring in oceanic climate, called acidophilous oak forests. In Poland, they only occur in the western part of the country and include forests on the poorest, often sandy habitats. In the conditions of more continental climate of eastern Poland, such habitats are covered by coniferous communities. Depending on soil conditions and geographic location, the following forests are distinguished: lowland oak forests on moist and wet gleyed soils, lowland oak forests on fresh soils, submontane oak forests on gleyed soils, and submontane oak forests on fresh soils. Acidophilous oak forests do not reveal any distinct natural tendencies towards changes in species composition and geographic range.

Communities of deciduous forests.(Class *Quercio-Fagetea*).The class includes 32 associations. This class includes most of the deciduous forest communities in Poland, occurring on mineral soils with different humidity. Depending on ecological diversity and character of predominant tree stands, the following groups of communities are distinguished; mixed lime-oak-hornbeam forests, beech forests, xerothermic oak forests, alluvial forests and sycamore forests.

- Mixed lime-oak-hornbeam forest is a European multispecies deciduous forests, most frequently dominated by hornbeam and oak trees, occurring in the lowlands and in the foothills (up to 650 m asl) on fertile and moderately fertile soils, mainly brown forest soils and not inundated soils. Besides hornbeam and oak, also maples, sycamore, elms, small-leaved lime and

European ash occur in the forest stand. In individual regions of the country, mixed lime-oak-hornbeam forests are encountered also with some contribution of beech (in the west), spruce (in the north-east) and less frequently – fir (in the south). In the shrub layer, there occur, inter alia, European spindle tree, hazel, common elder and dwarf honeysuckle. The herb layer is rich in species and most of them flower when trees are still leafless. Mixed lime-oak-hornbeam forests are diversified in Poland, both in geographical and habitat terms. In geographical terms, one can distinguish Atlantic mixed lime-oak-hornbeam forests in the northwestern part of the country - along the Baltic Sea and in the Pomeranian Lake District, subatlantic mixed lime-oak-hornbeam forests in the western part of the country, as well as subcontinental mixed lime-oak-hornbeam forests in the southern and eastern part. In habitat terms, depending on soil humidity and fertility, the following variants have developed: mesotrophic mixed lime-oak-hornbeam forest – moderately fertile and relatively dry; typical mixed lime-oak-hornbeam forest – on more moist and fertile soils, on gentle slopes and river terraces, as well as fertile mixed lime-oak-hornbeam forest – on moist soils in river valleys, at the foot of hills. In Poland, most of the habitats of mixed lime-oak-hornbeam forests have been deforested and turned into arable fields already long time ago. Therefore, well-developed oak-hornbeam forests have been preserved mostly only within large forest complexes. Moreover, they occur in the form of more or less degraded small fragments scattered in the agricultural landscape. Oak-hornbeam forests in economic forests have been partly deformed by pine cultivation in the past.

- Beech forests are also divided into lowland and mountain-submontane communities, as well as into floristically poor acidophilous beech forests and fertile beech forests developing on brown soils. The so-called orchidaceous beech forests constitute a specific form of beech forests, which occur on insolated slopes covered with dry limestone soils. They are characterized by frequent occurrence of rare, in Poland, orchids, mainly helleborine (*Cephalanthera sp.*), broadleaved helleborine (*Epipactis latifolia*) and bird's-nest orchid (*Neottia nidus-avis*).
- Xerothermic oak forests - floristically rich, thermophilous and dry forests, with oak tree canopy, a well-developed shrub layer, as well as graminaceous and herbaceous undergrowth with significant contribution of moderately xerothermic and often calciphilous species. In Poland they occur relatively seldom and lately quickly disappear. One forest-thicket xerothermic community is particularly noteworthy within this group. It occurs on the steep, mainly southern slope of the Odra River valley in the town of Bielinek, on brown soil developed from gravelly and sandy boulder clay of ground moraine, rich in calcium carbonates. It is distinguished by the presence of three plant species of extremely southern character, which do not have any other locations in Poland.
- Alluvial (riverine) forests - deciduous forests occurring on periodically inundated habitats, with high fluctuations of the subterranean water level, mainly in river valleys, on soils with different fertility, although most frequently on very fertile soils. Alluvial forests have a rich layer of shrubs and a lush herb layer. In Poland there occur lowland, submontane and mountain alluvial forests. In the lowlands, elm-ash riverine forests dominate in river valleys at a larger distance from a riverbed, on fertile fine-grained alluvial soils. In river valleys of small rivers, ash-alder alluvial forests predominate. In submontane alluvial forests, ash trees with some admixture of black and grey alder occur, whereas in typical mountain alluvial forests grey alder predominates

with some admixture of spruce, willows, as well as ash and sycamore. Due to regulations of rivers and agricultural needs, the majority of lowland riverine forests have been destroyed. And this, besides the influence on biological diversity, has also an adverse effect on water management.

- Sycamore forests (lime-sycamore forests) occur on steep, rocky slopes, hillsides of valleys and gullies in mountain regions. Two groups are distinguished: a group of lower subalpine associations, descending sometimes onto a submontane-upland zone and a group of mountain herbaceous sycamore forests.

Deciduous forests comprise communities of various dynamic values. Undoubtedly, a trend has been observed towards extinction of thermophilous oak woods. Recession of this association is conditioned by disappearing of traditional forest use forms (grazing). In many regions, alluvial communities are endangered as a consequence of desiccation of habitats. Among alluvial forests, the elm-ash forest is the most vanishing one, which is related to limitation or elimination of flood inundations on suitable habitats.

### **Non-forest communities of marine, coastal and saline areas**

Communities of submarine meadows (Class *Zosteretea marinae*). The class includes at least one association occurring in the sublittoral zone of the Baltic Sea at a depth of 2-10 m. Generally speaking, the class includes hardly investigated communities of „submarine meadows”, poor in flowering plant species, while with contribution of stoneworts, green and red algae. Communities from this class do not demonstrate any significant transformation tendencies.

Scattered submarine meadows (Class *Ruppiaetea maritima*). So far in Poland only 2 associations were distinguished in the Gulf of Gdańsk. Those are rich in algae, so-called „submarine meadows” in shallow waters (up to a depth of ca. 4 m). The detailed inventory of this type of communities requires further research. Communities from this class do not demonstrate any significant tendencies towards changes.

Communities of glasswort (Class *Thero-Salicornietea*) - include 3 associations. Those are communities dominated by glasswort, occurring on wet, highly saline habitats. Most probably, in Poland the class is represented by only one association, occurring on inland salt marshes, mainly in the Kujawy region. The remaining locations of two associations on the Polish South Baltic Coast most probably disappeared. Generally speaking, communities of this class are evidently at the extinction phase.

Pioneer communities of coastal dunes (Class *Ammophiletea*) - pioneer communities of graminaceous character (2 associations), occurring on the so-called white coastal dunes. One of the two associations is highly endangered by progressing abrasion and also by tourist penetration, despite the fact that it is totally protected due to its significance in strengthening the coast. Communities from this class do not reveal any significant transformation tendencies.

Halophyte communities of coastal therophytes (Class *Cakiletea maritima*). Floristically poor, halophyte and nitrophilous communities of annual plants, inter alia on the Baltic coast. Historically, patches of one association occurred e.g. at the mouth of the Świna River. Most probably, all known locations do not exist any longer and probably the association itself can be recognized as extinct in Poland.



Halophilous meadow communities (Class *Asteretea tripolium*). The class includes 5 associations. Those are communities of meadows and rushes connected with wet inland and coastal salt marshes. Some of the associations have subatlantic character and occur only in the western part of the Baltic Coast, others are connected with (salt) diapirs and saline waters in the Kujawy Region, near the town of Łęczycza, in Owczary near the town of Busko in the Nida Basin (Niecka Nidziańska) and near the town of Wieliczka. Generally speaking, communities of this class are clearly at the extinction stage.

### **Aquatic communities**

Communities of duckweeds (Class *Lemnetea*). Those are communities (6 associations) that form inactively floating and often fragmentary developed clusters of duckweeds on the surface of lentic waters and very slowly flowing waters. Floristically they are very poor and often form monospecies aggregations. Not endangered with their occurrence, common all over lowland Poland, they do not demonstrate any significant transformation tendencies, although some of their component species are relatively rare.

Communities of stoneworts (Class *Charetea*). The class includes 19 associations. Those are communities of benthic vegetation, composed mainly of stoneworts (*Charophyta*) and connected with oligo- and mesotrophic water bodies. Most of the communities occur in the form of nearly monospecies aggregations. Some of the communities are ephemeral: appear and disappear suddenly without any perceptible changes in the ecological environment. In general terms, communities from this class do not display any significant tendencies towards transformation.

Communities of inland waters (Class *Potametea*) The class includes 30 associations. Those are communities of submerged and rooted plants, occurring in inland water bodies meso- and eutrophic (stagnant or slowly flowing). Most of the communities are identified based on the domination of one species. Spread all over Poland in the lowlands and lower parts of the mountains, they do not demonstrate any significant tendencies towards transformation and are not endangered within their entire range, although their occurrence can undergo some changes in particular regions.

Communities of dystrophic water bodies (Class *Utricularietea intermedio-minoris*). The class includes 6 associations. Those are specialized, most frequently small-area communities occurring in shallow, dystrophic water bodies on peat substratum, often within the complex of fens and raised bogs. The occurrence of insectivorous plants from the genus of bladderwort (*Utricularia*) is a specific characteristic of those communities. They are relatively widespread, although seldom spotted. Although they are endangered as a consequence of changes in hydrographic conditions within peat-bog complexes, one cannot confirm any significant extinction trends yet.

Communities of oligotrophic water bodies (Class *Littorelletea uniflorae*). The class includes 9 associations. Those are communities of small aquatic or amphibian perennials connected with the littoral zone of oligotrophic inland water bodies. Due to Atlantic or oceanic-boreal range of their component species, geographically they are limited to the western part of the country and most frequently they occur in the Pomeranian Lake District. They seldom occur in Poland but their geographical range is relatively stable and do not demonstrate any significant tendencies towards extinction.

Communities of seepage spring areas (Class *Montio-Cardaminetea*). The class includes 8 associations. Those are communities of low plants (often with high contribution of bryophytes), occurring in seepage spring areas with clean, well-oxygenated water. They are divided into two distinct groups. The first one is connected with non-limestone seepage spring areas of slightly acid or neutral reaction, the other one occurs only in the neighbourhood of limestone seepage spring areas with water of alkaline reaction. In Poland those communities are still hardly investigated, most probably they occur mainly in the southern part of the country. They are not endangered within their entire range of occurrence and they do not demonstrate any significant dynamic trends, although particular locations happen to be destroyed with altered habitat conditions.

**Meadows, grasslands, peat bogs, graminaceous and tall herbaceous vegetation of miscellaneous habitats (except for mountain ones) - communities of wet and very wet habitats**

Communities of therophytes along water shores (Class *Bidentetea tripartiti*) include 7 associations. Those are nitrophilous natural communities of annual species occurring on drying up shores of inland water bodies and watercourses. Communities from this class are distinctly diversified into two groups. The first one dominated by beggarticks (*Bidens sp.*) and knotweeds (*Polygonum sp.*) is connected with silty substrate by reservoirs of stagnant waters. The second one, dominated by miscellaneous species of goosfoot (*Chenopodium sp.*) and saltbush (*Atriplex sp.*), occurs on riverbanks and sandbanks drying up in the summer. They are common in Poland. Although individual patches of communities are short-lived, their presence is not endangered; they are characterized by a stable geographical range and lack of any transformation trends.

Communities of small therophytes (Class *Isoeto-Nanojuncetea*) include 7 associations. Those are communities of tiny annual species with a short life cycle, connected with humid and wet mineral substrate. The communities are ephemeral: they both develop and vanish quickly. In general, they have West-European character, therefore they occur more frequently in western Poland. Among species characteristic for the associations, some of them are real floristic rarities. Communities from this class do not demonstrate any significant transformation trends.

Rush and sedge communities (Class *Phragmitetea*). The class includes 33 associations. Those are communities of rushes and sedges, occurring in the littoral zone of watercourses and water reservoirs, as well as in boggy depressions amidst meadows and peat bogs. Most of them are characterized by high biomass production and are peat-forming communities. A considerable part of the associations has a wide geographical range and occurs commonly all over Poland, only a few of them have a geographically limited range. The most common community of this group – reedbeds (*Phragmitetum*) – has relatively high habitat flexibility. Most of the communities from this class do not reveal any significant tendencies towards transformation, although they might have a slight tendency towards extinction in certain regions, resulting from desiccation of habitats.

Fens and mires (Class *Scheuchzerio-Caricetea*). The class includes 13 associations. The order *Scheuchzerietalia palustris* comprises natural communities of low sedges from transition mires and the hollow stage of raised bogs. They constitute a refugium for many relict species from cold, late glacial and early Holocene periods of the sub-boreal and boreal type of range. The order *Caricetalia fuscae* includes acidophilous meadows and communities of low sedges common all over

the Polish fens, however, anthropogenic in the majority of cases (developed after cutting down swampy forests). The order *Caricetalia davallianae* includes fertile fens with the physiognomy of low-growing meadows with high contribution of sedges on alkaline and neutral habitats, or at the most, slightly acidified at the surface, supplied by waters with a high content of calcium carbonate. Communities from this group are frequently floristically rich; numerous rare species occur here. The class includes communities of different dynamic values. Transition mires and fertile meadow peat bogs are the most endangered. Their extinction has been observed, which results mainly from succession processes.

Raised bogs (Class *Oxycocco-Sphagnetea*). The class includes 8 associations. Those are communities of raised bogs, occasionally with some contribution of trees and wet heathlands with peat mosses on acid oligotrophic habitats. In general, typical raised bogs have a boreal type of range and occur more frequently in northern Poland. Whereas, wet heathlands have Atlantic and West-European character, and in Poland they are encountered mainly in the western part of the country and on the coast. At present, large complexes of raised bogs are not highly endangered, whereas in the case of small-area peat bogs, systematic but slow extinction has been observed, which results most frequently from general desiccation of the area and its eutrophication.

**Meadows, grasslands, peat bogs, graminaceous and tall herbaceous vegetation of miscellaneous habitats (except for mountain habitats) - communities of humid, fresh and dry habitats**

Communities of meadows, pasturelands and tall herbs (Class *Molinio-Arrhenatheretea*). The class includes 30 associations. In general, those are semi-natural and anthropogenic meadow communities, or resembling the aforementioned, connected with mineral or mineral-organic substrate and subject to different forms of meadow-grazing exploitation. The order *Plantaginietalia* includes anthropogenic communities, the so-called „carpet grasslands” occurring on various substrata and conditioned by the presence of systematic trampling. They commonly occur in courtyards, public squares, dirt roads and sports grounds. The order *Trifolio-Agrostietalia* comprises semi-natural, low meadow communities, in some places periodically partially or completely inundated by high waters. The order *Molinetalia* includes associations of partially natural tall herbaceous vegetation, occurring as vegetation fringes or as an overgrowing phase of unmown meadows, as well as communities of once-mown and not fertilized grasslands of variable humidity on mineral soils of a wide trophic amplitude: from acid mesotrophic habitats to very fertile alkaline habitats. The order *Arrhenatheretalia* includes communities of lowland and submontane meadows mown several times a year, as well as pasturelands on not particularly moist mineral soils. At present, species composition of meadows undergoes rapid changes as a consequence of new agrotechnical methods aiming at intensification of production. Very different dynamic trends have been observed within the class. Generally speaking, the least transformations concern meadows from the order *Arrhenatheretalia*, whereas within the order *Molinetalia* wet meadows evidently decrease their occurrence and tall herbaceous vegetation strongly develop at their expense.

Grasslands with *Nardus stricta* and heaths (Class *Nardo-Callunetea*). The class includes 15 associations. Those are two groups of semi-natural and anthropogenic communities. The first one includes low grasslands and meadows dominated by mat grass (*Nardus stricta*). Most

frequently they develop secondarily on very lean acid substrate, as a consequence of improper grazing exploitation. They are common all over Poland, although they never cover any larger areas. The other group of communities includes heaths, which in Poland are extremely anthropogenic and relatively short-lived. They occur on lean, sandy grounds in places where pine forests were cut down and within certain forms of acidophilous oak forests. They are more properly developed in western Poland, only bearberry heath is connected with eastern Poland. Heaths with crowberry are connected with coastal areas, and some of them are natural. Communities of this class do not reveal any directional transformation trends, although their surface area may oscillate depending on changes in the agricultural land-use intensity.

Fringe communities (Class *Trifolio-Geranietea sanguinei*). The class includes 10 associations. Those are communities of photophilous and thermophilous perennials occurring in natural conditions along the edges of dry and fresh forests (that is at the boundary between a forest and graminaceous community). They can also spread secondarily into forest and roadside glades. They are common all over Poland and – in the countrywide dimension - they do not reveal any significant directions in their transformations.

Galmei grasslands (Class *Violetea calaminariae*). The class includes communities of low grasslands growing on sites with high concentration of heavy metals, such as zinc, lead and copper, as well as cobalt, nickel and others. Their characteristics and distribution are still hardly investigated but it is assumed that at least one association (characterized by the presence of xeromorphic and dwarfed subspecies, and ecological forms of flowering plants) occurs in Poland near the towns of Boleslaw and Olkusz, as well as on chromium-rich serpentine outcrops in Lower Silesia. Due to very specific habitats, galmei grasslands are not particularly variable and they do not reveal any trends concerning spreading.

Sandy grasslands (Class *Koelerio glaucae-Corynephoretea canescentis*). The class includes 21 associations. Generally speaking, those are communities of sandy grasslands, semi-natural or extremely anthropogenic, composed mainly of xerophilous and acidophilous species of grasses. They cover soils of different development extent – from initial soils to well developed podzols. They are widespread all over Poland, although certain communities may have significantly narrower ranges, limited to coastal or regional dunes situated along the western border. In the countrywide dimension, they do not reveal any significant directions in their transformations.

Xerothermic grasslands (Class *Festuco-Brometea*) include one order and three alliances with 10 associations. Those are thermophilous grasslands of pseudo-steppe nature. In Poland they are partially relict and their secondary spreading is related to appropriate local conditions: dry, basic substrate; strong insolation; often with steep inclination. They are one of the richest communities in vascular plant species, a considerable part of which has the southern – (eastern) – European type of range. In Poland they are rare or even very rare, and most probably their area of occurrence is still being reduced.

#### **Non-forest mountain communities**

Communities of rock crevices (Class *Asplenieta rupestris*) include 6 associations. Those are natural communities of rock crevices in higher parts of the mountains, composed mainly of small ferns from the genus spleenwort (*Asplenium*). In the impoverished form, they are encountered in the

lowlands on old walls and ruins. Communities from this class are distinctly ecologically diversified into two groups – connected with limestone substrate and occurring on acid rocks. In the countrywide dimension, they do not reveal any significant directions in their transformations.

Communities of screes and gravel banks (Class *Thlaspietea rotundifolia*) include 9 associations. Communities from this class occur on migrating or hardly fixed screes in rocky parts of the mountains and on gravel banks in mountain sections of river valleys. They are not well investigated yet; one should assume that in the future the number of identified associations would increase. In the countrywide dimension, they do not reveal any significant directions in their transformations.

Communities of mountain snow beds (Class *Salicetea herbaceae*). The class includes 6 associations. Those communities occur in places with long-lasting snow cover in high mountains (in Poland mainly in the Tatras, but also on Babia Góra Mt and the Karkonosze Mts). Some of the associations are characterized by the presence of recumbent species of small willows. The species composition is diversified depending on the type of substratum (limestone or not limestone), as well as duration of snow deposition and the thickness of its cover. In the countrywide dimension, they do not reveal any significant directions in their transformations.

Mountain calcareous grasslands (Class *Seslerietea variaie*). The class includes 6 associations. Those are natural, sustainable (conditioned by climate) alpine grasslands in the alpine-forest zone on limestone substratum. In Poland they are well developed in the Tatras (Mts). They do not reveal any significant directions in their transformations.

Mountain non-calcareous grasslands (Class *Juncetea trifida*). The class includes 4 associations. Those are natural, sustainable (conditioned by climate) alpine grasslands in the alpine-forest zone, on acid substratum. In Poland they are well developed in the Tatras. They do not demonstrate any significant directions in their transformations.

Tall herbaceous and alpine graminaceous vegetation (Class *Betulo-Adenostyletea*). The class includes 15 associations. Those are alpine, natural communities of tall magnificent dicotyledonous perennials or grasses, occasionally with some contribution of shrubs. They occur on relatively fertile, moist and wet habitats. In Poland they are mainly encountered in the Tatras and the Karkonosze (Mts). They do not demonstrate any significant directions in their transformations.

### **Segetal, ruderal and other highly anthropogenic communities**

Communities of weeds on arable lands (Class *Stellarietea mediae*). The class includes 36 associations. Those are two groups of communities; the first one includes communities of annual weeds from crop fields (20 associations), the second one includes 16 associations of annual or biennial, slightly nitrophilous plants from ruderal places and rubble heaps. Current transformations in cultivation methods (mechanical sowing and harvesting, winnowing, fertilization and application of pesticides) bring about strong changes in the species composition of segetal communities and development of new, previously not occurring species combinations. Although typically developed phytocoenoses of individual weed associations are still relatively common in Poland (especially in small farmstead), one should assume that new associations will be identified in the future, and those currently known will either entirely disappear (such as e.g.

the weed community in flax crops), or they will occur on small areas, in specifically created reserves.

Communities of logging (clearing) sites (Class *Epilobietea angustifolii*) include 11 associations. Those are nitrophilous communities developed at clearing sites. They are connected with secondary succession after stand cutting. Depending on the regeneration stage, annual species, perennials or shrubs dominate in communities. They are common all over Poland. They do not reveal any significant directions in their transformations.

Communities of nitrophilous perennials (Class *Artemisietea vulgaris*). The class includes two subclasses with 32 associations. Those are nitrophilous communities of big perennials and climbing plants. The first subclass includes anthropogenic associations from ruderal habitats (rubbish dumps, places near cottages and fences, sometimes untended lawns and roadsides), whereas the second subclass includes natural and semi-natural, humid and shaded fringe communities, most frequently occurring along water shores. They are common all over the country. They do not reveal any significant directions in their transformations.

Communities of coach grass (Class *Agropyreteea intermedio-repentis*). The class includes 6 associations. Those are communities dominated by coach grass, developed on fallow lands, roadsides, construction sites. Due to changes in land use, those communities became very common all over the country. They are xerothermic to some extent and are connected with not particularly acid substrate. Although communities from this class are relatively long-lived (they can exist for several years), they constitute transition stages of succession towards cultivated meadows or towards tall herbaceous vegetation, as well as thicket and forest communities.

The total number of the identified plant associations in Poland, described according to the phytosociological principles equals 485. Taking into consideration the frequency of the occurrence criterion, it is possible to distinguish the following categories:

- 12 % constitute communities widely distributed across the country or in its extensive areas;
- 5 % constitute communities unevenly distributed across the country; in some regions very common, in other absent;
- 37 % constitute moderately common communities, appearing all over the country or in most regions;
- 24 % constitute moderately common communities, appearing in some regions;
- 22 % constitute rare associations, found only in few localities.

Also the proportion of plant associations in the plant cover and vegetation varies. Some of them form extensive plant communities (38 % of all plant communities), covering many hectares of land (e.g. forests, agrocenoses or meadows) and some cover minor areas (21%).

Plant associations occupying moderate area constitute 41% of all country plant communities.

The number and distribution of different range type plant communities considerably differ:

*Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

- approximately 12 % of the total number of communities should be considered as endemics of Poland (i.e. typical only of Poland or adjacent areas). They can be found mainly in the southern part of the country, of the total number of 46 endemic communities about 11% occur in Małopolska, about 17 % in the Sudeten Mountains, about 68 % in the Carpathians, and about 4 % in other regions;
- about 3 % are (sub) Atlantic-West-European communities. (Sub) Atlantic plant communities are present mainly in the Szczecin Pomerania, where their number exceeds 25, being very rare in other areas;
- about 40 % are of the Euro-Asian continental character. Communities of the continental character are present mainly in the eastern part of Poland, where their number exceeds 12, with no more than three types in the western part. Occurrence of a narrow strip of land stretching out from the Roztocze to the Małopolska Upland deserves special attention as the concentration of communities is exceptionally high there, with about 18 types being found;
- 1 % of communities are of oceanic-South-European range, and about 4 % are South-European continental plant associations of sub-Mediterranean type. Concentration of plant communities of this range type is observed in the narrow area, stretching out from the Roztocze to the Małopolska Upland, with the maximum number (about 20) in the area of Niecka Nidziańska;
- about 10 % of communities are of the North-European boreal character. Boreal plant communities are present mainly in the north-east region of Poland, where their number exceeds 30, with less than five communities of that range type communities being found in southern Poland;
- approximately 30 % complexes are plant associations of the Central-European range type. No clear spatial variation was noted for their occurrence.

Approximately 10 % of the communities identified in Poland are of the alpine and sub-alpine character with 95 % of them being natural plant communities. Approximately 16% of total number of identified communities are mountain and foothill communities, with 75 % of them being natural plant communities. Upland and lowland plant communities makes up about 69 %, in this proportion approximately 49 % being natural plant communities, next 30 % being semi-natural, and the remaining represent clearly synanthropic communities. The remaining 5 % are sea-coast related, among them 95 % of types being natural plant communities. Generally, natural plant communities account for almost 61 % of the total number of communities, semi-natural ones for 25 %, and synanthropic communities account for about 14 % of all the types, whereas the latter ones (mainly segetal and ruderal) cover at least 55 % the country area and entirely natural communities less than 10 %.

Particularly valuable plant communities, because of their rarity and outstanding specificity of their habitats include all the communities representing the following classes: *Asteretea tripolium*, *Thero-Salicornietea*, *Seslerietea varia*, *Juncetea trifidi*, *Betulo-Adenostyletea*, *Salicetea herbaceae*, *Violetea calaminariae*, *Festuco-Brometea*. Some of those populations are climatic relics (e.g. some xerothermic grasslands). Considerably specific and rare habitats include communities representing beech woods

**Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland**

associations of *Cephalanthero-Fagenion* sub-alliance, that is *Carici albae-Fagetum*, *Cephalanthero rubrae-Fagetum*, *Fagus sylvatica – Crucjata glabra* (= *Carici-Fagetum convallarietosum*) community, *Fagus sylvatica-Hypericum maculatum* community, *Fagus sylvatica-Cypripedium calceolus* community and lower montane spruce forest on peat *Bazzanio-Piceetum* of the *Vaccinio-Piceetea* class.

Complexes valuable because of rare habitats include also associations which are endangered or threatened in Poland as a result of disappearing and changing habitat conditions. These are, i.a.: *Honckenyo-Agropyretum juncei* from the *Ammophiletea* class and *Atriplicetum litoralis* of the *Cakiletea maritimae* class.

The separate group of very rare communities are plant communities composed of species occurring in only few locations in Poland. Among others they include: *Asplenietum septentrionali-adianti-nigri* and *Asplenietum cuneifolii* of the *Asplenietea rupestris* class, *Sphagno-Utricularietum ochroleucae* of the *Utricularietea intermedio-miniris* class and *Oxyrio digynae-Papaveretum tatrici* and *Cerastio latifolii-Papaveretum tatrici* of the *Thlaspietea rotundifolii* class. The last community is also a Tatra Mountains endemic.

Plant communities occurring in single locations Poland, thus being an exceptional peculiarity of the native vegetation are represented by Pine woods of the *Erico-Pinetea* class (*Pinus sylvestris-Calamagrostis varia* and the *Pinus sylvestris-Carex alba* communities) found in the Pieniny Mountains and being relics of warm periods. Oak wood with mossy oak *Quercetum pubescenti-petraeae* (= *Lithospermo-Quercetum*) of the *Quercu-Fagetea* class is of similar character, found only in the surroundings of the Bielinek on the Oder. Its characteristic feature is the presence of three species of oceanic-Mediterranean type of the range. They are: the downy oak (*Quercus pubescent*), purple gromwell (*Lithospermum purpureocaeruleum*) and *Dorycnium herbaceum*. Bielinek is the only one location where those species occur in Poland. Another curio deserving mentioning, is a community of *Cochlearietum polonicae* representing the *Montio-Cardaminetea* class. The community is built by endemic species, related with sandy substrate in cold well-heads. Its only natural stand was in Olkusz surroundings, on the edge of the so-called Błędowska Desert. Because of the far-reaching anthropogenic transformation of the land that stand no longer exists. However, the appropriate number of specimens was successfully transferred earlier to the new secondary stands, which saved existence of both species and the community.

Outstandingly valuable communities because of their rarity and relic character include also plant communities of *Littorelletea uniflorae* class, making up flora of oligotrophic lakes, so-called lobelia-lakes. Rush and sedge communities are of similar relic character being related to the range of the main species include: *Cladietum marisci*, *Caricetum vulpinae*, *Caricetum buxbaumii* of the *Phragmitetea* class and numerous peat-bog plant communities such as *Caricetum diandrae*, *Caricetum chordorrhizae*, *Caricetum heleonastes*, *Orchido-Schoenetum nigricantis* and *Schoenus ferrugineus* community of the *Scheuchzerio-Caricetea* class.

Spatially limited range as a result of the bio-geographic character of the community, is also typical of the West-European low sandy grasslands, such as: *Filagini-Vulpietum*, *Airetum praecocis*, *Airo caryophylleae-Festucetum ovinae* of the *Koelerio glaucae-Corynephoretea canescentis* class, or sub-continental bearberry heath *Arctostaphylo-Callunetum* of the *Nardo-Callunetea* class.



Individual plant associations differ in their dynamic characteristics. While some have clearly extended their ranges, others occupy almost unchanged area for years. There is also a group of endangered or threatened plant communities. It is assumed, that of approximately 280 types of plant associations of lowland Poland three have become extinct within the last decade, 55 are endangered, and almost 130 are classified as threatened. Among them semi-natural communities deserve special attention. The causes of reductions in the ranges and number of patches of given vegetation types shrinkage vary. Some types of plant associations are threatened as a result of changes in the cultivation methods. A classic example here is *Spergulo-Lolietum remoti* community, related to the traditional cultivation of flax. As a result of the change in the technology of seed cleaning, sowing and harvesting, the community is probably entirely extinct in Poland. Similarly, humid meadows of the *Molinion* association are disappearing due to a lack of fertilizing and a single (autumnal) mowing. A part of those meadows are overgrowing with bushes, because their cultivation has been given up, other transform into the meadows of the *Calthion* alliance as a result of intensive cultivation. Also reduction in the number of the xerothermic oak wood stands (*Potentillo albae-Quercetum*) is recorded, forests which are of at least partly (zoo) anthropogenic character and depend on limited cutting and traditional cattle pasturage within its area, today given up.

Another group of rare and endangered plant associations is related to rare and special habitats. They include mainly all xerothermic grasslands of the *Festuco-Brometea* class, relic forests of the *Erico-Pinetea* class, high peat bogs of the *Oxycocco-Sphagnetea* class, Volhynian and Nida type of the deciduous forest (*Tilio-Carpinetum*) and numerous other plant associations. Here belong also freshwater associations related to so-called lobelia-lakes, classified into the *Littorelletea* class.

The next group of endangered plant communities are related to habitats considerably transformed by man. The group includes fertile fens of *Caricion davalliane* association and halophytic communities, both littoral and inland ones.

One of the main factors causing significant habitat changes is a change in water conditions, which means drainage and embankment regulation of riverbanks. In such conditions a part of habitats of poplar-willow riparian forests (*Salici-Populetum*) quickly disappear and can transform even into habitats of mixed forests and elm-ash riparian forests (*Ficario-Ulmetum*) evolving further into lime-oak-hornbeam forest habitats. Land reclamation in large areas of swamps cause gradual disappearance of alder habitats (*Sphagno-Alnetum* and *Ribo-Alnetum*) and habitats of the alder-ash riparian forest (*Fraxino-Alnetum*). In many cases this process leads to poor lime-oak-hornbeam habitats. As a result of the dehydration, raised and transition mires are also disappearing on a large scale.

From the all-European perspective, the vegetation of Poland is characterized by a very high share of rare and deserving protection ecosystems. According to the Habitats Directive, 218 natural habitat types should be protected within the area of the European Union. Of the above total 76 types of habitats have been recorded in Poland. Those habitats are inhabited by 294 plant communities, that is, c. 60 % of total number of plant communities in Poland. It is worthwhile adding here, that as many as 23 phytosociological classes consist fully of communities, which should be subject to protective actions in their total range or in specific habitats.

The remarkable feature of the nature in Poland is high diversification of the species of the native flora and fauna, being both the effect of the influence of physical-geographical factors and human economical activity. The situation of individual systematic groups of organisms is as follows:

## **Plants and wild fungi**

### Angiosperms

According to present knowledge, flora of angiosperms in Poland includes 2 844 species, of which 439 are anthropophytic species, being already permanent components of the domestic flora.

Among species developing in Poland there are relatively few endemics, more numerous is the group of relics of the Pleistocene period, inhabiting mainly the alpine and subnival belts of the Carpathian and Sudeten Mountains. Of late-Pleistocene age are also species inhabiting specific habitats in Pomerania (raised and transitional mires and oligotrophic lakes).

The major threat to the flora of angiosperms is transformation of habitats. The most endangered species are those living in small, often relic populations, near large cities and industrial sites, due to increasing influence of pollution and intensive land surface transformation. Other endangered components of the flora are those living in very rare habitats in Poland. Among them there are salt marshes being overgrown with plants of rush associations or eliminated as a result of the developing economic activity. Changes of cultivation methods and use of crop protection chemicals cause serious decline in old field weeds, with the example of almost total extinction of the species connected with the cultivation of flax, such as *Camelina alysum* and the flax dodder *Cuscuta epilinum*. Apart from chemicals, other important factor contributing to the process of impoverishment of the flora of weeds is the use of cleaned planting seeds, what makes impossible for them to sow itself together with the diaspores of a cultivated plant.

Another major threat to the native resources of angiosperms is introducing anthropophytes (i.e. synanthropic species alien in a given area) into the vegetation. Many species of trees and bushes introduced in Poland in the last decades, as decorative plants or planted in forests, has settled in and begun the expansion, not only on synanthropic habitats but also on half-natural, supplanting native ones.

The growing state of knowledge about the distribution and situation of the population of individual species allows to estimate the extinction risk for important components of the flora. First edition of the *Polish Red Data Book of Plants* from year 1993 covered 206 taxa (that is c. 10 % of Polish vascular flora). Species were categorised according to IUCN risk criteria being then in effect. In the second edition from year 2001, extended by nearly 50 % species, altogether 296 taxa have been presented (mainly in the rank of species, in several cases - of subspecies) what constitute 15 % of vascular flora of the country. Most of those plants are native species or species domesticated for ages.

Classification of taxa has been based on the most recent threat categories announced by the International Union for Conservation of Nature (IUCN) in 1994. The book includes 31 completely extinct species (EX category – i.a.: *Cornus suecica*, *dichostylis Michela*, *Dianthus nitidus*, *Najas flexilis*, *Carex microglochis*, *Orchis tridentata*, *Camelina alysum*), seven species extinct in the wild,

but cultivated or on secondary stands (EW category), 74 species critically endangered (CR category), 59 endangered species (EN category), 102 vulnerable species (VU category), 21 species in lower risk category (LR category) and two species of a unknown degree of the threat (DD category).

#### Gymnosperms - Pinophyta

In the native flora of Poland *Pinophyta* are represented by 11 to 13 species (depending on the taxonomy used), belonging to the coniferous class (*Pinopsida*). There are no endemics among *Pinophyta* in Poland, however a few species, particularly mountainous, as the arolla pine (*Pinus cembra*), are probably relics.

Independently of their natural expansion, *pinophyta* were widely introduced by man for forest planting. Spruce (*Picea abies*) has been planted on a large scale on the Western Pomerania, outside its natural range. Similarly the silver fir (*Abies alba*) which has several anthropogenic localities, also outside its natural range. The Scots pine (*Pinus sylvestris*) has been universally planted on deciduous and mixed forests habitats at least since 19th century, being now most widespread tree species in Poland.

Considerable threat to *Pinophyta* are gas and dust pollutions. As a result, large stretches of coniferous forests were damaged in the Sudeten Mountains in 80s of the 20th century.

Weather conditions in 2006 (long summer drought and record high temperatures in July), were favourable for the development of secondary vermin and growth of root systems infections by the *armillaria*, which accelerated the process of mass extinction of spruce tree stands in the Silesian and Żywiec Beskid lasting from year 1995. Many alien *Pinophyta* are planted in parks and gardens as decorative trees. In the last decades some of them has settled in Poland, demonstrating tendencies of expansion. In particular it concerns Japanese larch (*Larix kaempferi*) and japanese yew (*Taxus cuspidata*)

The endangered gymnoseprms manly due to its small population number inclvude *Pinus rhaetica* and *Juniperus sabina*.

#### Lycopodiophyta

*Lycopodiophyta* are represented in Poland by 13 species, mainly the glacial or boreal period relics.

All the species found in Poland are endangered. In the last years (second-half of the 20th century) decline of the species in their habitats has been observed. The same applies to the taxa previously common, as the Stag's-Horn Moss (*Lycopodium clavatum*) and stiff clubmoss (*Lycopodium annotinum*).

The main reasons of *Lycopodiophyta* decline are changes in habitats. In the case of mountainous species stands, a threat to photophilous species connected with open high mountain grasslands habitats is a disappearance of pasturing in high mountains and progressing succession of forests. A threat to lowland species is increasing eutrophication of lakes (what particularly concerns localities of isoetales still numerous in the Western Pomerania) and disappearance of transition peat-bogs, being habitat i.e. of marsh clubmoss (*Lycopodiella inundata*).

### Equisetopsida

*Equisetopsida* are represented in Poland by 10 species. No presence of endemics or relics has been observed (however it is possible, that some grew in the country during the last glacial period).

Several *Equisetopsida* species like field horsetail (*Equisetum arvense*), wood horsetail (*E. sylvaticum*) and swamp horsetail (*E. fluviatile*) are common in the country. Other species are of limited range. *Equisetopsida* are found in different localities, both on farm and ruderal lands, but also in forests, rushes, on riverbanks and inland sandbanks.

None of *Equisetopsida* species is clearly endangered, with a sole exception of the Dutch rush (*E. hiemale*), whose locations remarkably decreased in the last years. However some species loose their primary habitats. In particular field horsetail (*E. arvense*) at present with majority of locations in synanthropic communities. Similar tendency, but on smaller scale, can be observed in case of marsh horsetail (*E. palustre*) and variegated horsetail (*E. variegatum*).

### Pteropsida

In Poland there are 52 species of *Pteropsida*. These plants occur in relatively many places, because of easy spread ability thanks to light spores. There are no endemics among them.

The most endangered include those representing the subclass *Ophioglossidae* from *Botrychium* and *Ophioglossum* genera. Other threatened species is the royal fern (*Osmunda regalis*) of the subclass *Osmundidae* and species growing in rock crevices.

### Mosses

It is assessed, that over 700 species of mosses are present in Poland (697 are registered). They belong to four following classes: peat mosses (36 species), lantern mosses (6 species), Polytrichopsida (22 species), Bryopsida (636 species).

In Poland there are no endemics among mosses, and the most valuable are relics, especially old mountainous species, which during Pleistocene spread into lowland areas particularly to the Pomeranian and Masurian lake districts, where they at present have relict locations, mainly on an erratic blocks. Separate group consists of mosses originally from arctic and sub-arctic areas, which, after the glacier had retreated, have relict stands scattered on swamps and peat bogs all over the country.

As a result of human activity and influence on the environment, range of many mosses species decreased and some species are endangered. Main reasons for their disappearance are: polluting the atmosphere industrial emissions, chemical pollution of the environment, changes of hydrographic conditions (especially draining lands and the exploitation of peat bogs), destruction of small-scale habitats being refuges for mosses, and excessive tourism in valuable areas. The most exposed to anthropopression are species: peat-bog and marsh, epiphytic of forest and free-standing trees, saxicolous (especially inhabiting erratic blocks on lowlands) as well as those growing on uncovered wet or damp soils.

On the Red list of the endangered mosses in Poland, 137 species have been placed, among others: 4 species regarded extinct, 17 species endangered and 45 species threatened.

### Marchantiophyta

It is assessed, that 250 species of liverworts are present in Poland (234 are registered), with dominating group of leaf-shaped liverworts (179 species) and significant proportion of thallophytes (55 species).

There are no endemic species in Polish flora of liverworts, but there is numerous group of species with their ranges beginning or ending within the country territory. Of special value are climatic relics related to cold glacial phases of the late Pleistocene. Occasionally also relics of earlier geological periods (i.e. from the Tertiary can be observed).

The most important threat for liverworts is loss of specific habitats, among them old natural forests, swamps and peat-bogs. The group of liverworts which suffered the most heavy losses are epiphytes. These species, only several dozen years ago often found on trees with smooth bark, at present are almost entirely extinct. Progressing disappearance of epixyls, growing on the decaying logs, stumps and branches, can also be observed. There is also constant decrease of species inhabiting well-heads, fens and mires, particularly on the Pomerania Lake District and on Warmia and Masuria. Also flora of mountainous rivers is decreasing quickly due to deforesting the hillsides of valleys and the common practice of transporting logs down using the riverbeds, which are comfortable for this purpose. Also species living in xerothermic grasslands decrease their range, as well as apophytes (i.e. species of synanthropic plants of local origin, found in artificial habitats).

The Red List of Polish endangered liverworts includes 45 species, what constitutes 19.2 % of the country flora of liverworts, the proportion of mountainous and lowland species being almost equal (48 % - 41 %).

### Algae

It is estimated that in Poland there are about 10 000 algae (14 497 registered, a large part of which being synonyms), the dominating group constitute diatoms (3 100 species), desmidie (2 000 species) and blue-green algae (1 000 species).

The moderate climate of Poland and Poland's geographical location create particularly favourable conditions for development of Euro-Siberian and cosmopolitan species. There are no endemics.

Valuable and rare species are i.a.: alpine species of the diatom *Achnantes marginulata* inhabiting the Tatra Mountains ponds, lakes and streams, communities inhabiting peat bogs of the Sudeten Mountains and species inhabiting lakes of Warmia and Masuria.

Changes in the species diversity of individual taxonomic algae groups depend on the pace and quality of anthropogenic factors, specially those contributing to the increasing eutrophication and fertility of water basins. Both factors cause the exaggerated development of their population, especially in case of cosmopolitan algae, which do not have specialized environmental requirements and occurs in many diametrically different types of habitats, what causes more and more often and common flourishing of water basins.

The fast pace of environmental transformations, hence creation of short-lived habitats is a cause of increasing occurrence of fast developing, early reproducing and very fertile algae species. They

increasingly inhabit small water basins with big concentration of nutrients, competing with species with slower pace of the development and delayed reproduction.

Environmental transformations cause also creation of all sorts of strains within group of cosmopolitan species, adapted to given conditions, and many new forms of morphological ecotypes. They dislodge species of limited amplitude of the range, example of what is, among other, impoverishment of the diversity of diatoms in the Tatra Mountains streams.

Available research data indicate that at least 29 species of algae seems to be extinct, as they had not be found in the last twenty-year period in spite of intensive searches. Among them are diatoms, as well as *Oedogoniales* and red algae e.g. *Bangia atropurpurea* and *Thorea ramosissima*. There is also considerable group of very endangered species (at least 21 species). Above data has only approximate character due to the lack of possibility of conducting comprehensive and full research of all systematic groups of algae inhabiting the territory of Poland.

### Lichens

It is estimated that in Poland there are approximately 1 900 species of lichens and lichenicolous fungi of various taxonomical membership (1 494 was registered), with *Ascomycetes* as the dominating group of lichenized fungi. There is also significant proportion of fungi of various taxonomical membership (300) and of „imperfect fungi” (24). Class of *Basidiomycetes* (*Basidiomycota*) is represented only by three species.

The group of Polish lichens is not very specific. It consists mainly of species occurring also in other European countries. However there are several dozen species that occur mainly in Poland. In particular: *Agonimia repleta*, *Aspicilia faginea*, *A. microlepis*, *Buellia ocellata*, *Fitzera lamprophora*, *Harpidium rutilans*, *Lecanora tephraea*, *Lecidea sudetica*, *Porina sudetica*, and others. Valuable are also halophilic lichens having single stands on Baltic coast: *Caloplaca marina*, *Lecanora helicopsis* and *Pyrenocollema halodytes* and lowland relic stands of Arctic-alpine lichens. Other interesting group is ground lichens characteristic of xerothermic grasslands, e.g. *Fulgensia fulgens* and *Squamarina lentigera*.

Sensitivity of lichens to anthropopression, particularly to gas air pollutions, causes that many species are endangered. It is estimated, that 142 species are already extinct, whereas 380 species are recognized as endangered. In the last few years however, in case of some species of lichens a process of the recolonisation has been observed. The main reason being the reduction of contaminants emission and the progressing changes in the forest management.

### Fungi

It is estimated that in Poland there are approximately 12 500 species of fungi (3 630 registered), with dominating group of *Mycota* (11 840 species), mainly from classes: *Basidiomycotas* (5 170 species), *Ascomycotas* (4 320 species), *Deuteromycotas* (1 750 species). Generally, they are organisms of relatively extensive ranges of occurrence. Some species are considered as ubiquitous, there are also polyphagous species characterized by broad environmental tolerance. *Glomeromycota* and pathogenic fungi of plants shows geographical distribution depending on distribution of plants and typical habitats.

The population of fungi in Poland is not sufficiently known yet. There is also lack of specialist literature covering comprehensively endemism, ubiquitous character and range shifts.

Research conducted up to now, effecting in publishing the Red List of *Macromycetes*, have shown that 71 species are already extinct and they are no longer present at old, historic locations, whereas 171 species are very endangered.

Threats to occurrences of fungi in Poland are of the same intensity as observed in other European countries. The main threat factors are:

- disappearing or degradation of habitats (endangered fungi: Glomeromycota, pathogenic fungi and saprophytic fungi connected with the old fir, larch, oaken and beech trees; accompanying plants of peat bogs and swamps – due to the lowering level of groundwater; connected with riparian forests - endangered because of reduction of their acreage);
- emission of industrial and transport pollutants of air, waters and soils (endangered are fungi growing in industrial areas, within large urban agglomerations and along motorways and dual carriageways);

changes in agricultural and fruit production (reduction of acreage or abandoned cultivations of some species or cultivations of plants; increased use of chemicals in the agricultural environment – endangered are fungi particularly sensitive to environmental changes).

### **Wild-living animals**

It is estimated that in Poland there are over 47 thousand species, of which 35.5 thousands have been already registered. The greatest richness and diversity occurs in invertebrate animals which account for 98 % of species richness of the domestic fauna. Most numerous invertebrates are insects with the number of species constituting over 75 % of total number of Polish animals. Polish fauna (similarly as flora) to a large degree is connected with the environments typical of the Central-European Depression. However, continental and Atlantic influences, as well as the presence of mountain ranges and height, place it high on the scale of European biological diversity. Beside the fauna of mountain areas, distinctive is fauna of southern regions of Poland, in centre-eastern region, including among other the Małopolska Upland and the Krakowsko-Częstochowska Upland, the Świętokrzyskie Mountains and the Roztocze. These lands constitute range patches for several species of animals, including sub-alpine and pontic species. Fauna of the Polish depression considered as a region is quite homogeneous, although different faunistic subregions can be recognised, e.g. clearly distinctive subregion of north-east part of Poland, being an enclave of boreal species.

Generally, the fauna of Poland is to a great degree similar to the fauna of neighbouring countries, however has its specificity caused by the significant participation of species having in Poland borders (eastern, west, north or south) of their geographical range.

The Polish animal world includes only few endemic species. The majority of them are found in the mountains and territorially they are connected mainly with the Carpathian range – so-called Carpathian endemics. Polish fauna is also not rich in relic species, however in some classes, e.g. *Orthoptera* or *Mollusca*, their proportion can be relatively significant. Majority of relic species *Orthoptera* is closely connected with relict environments such as rock grasslands, semi-natural dry

grasslands, peat bogs and swamps. Relic species, due to their origin, have relatively narrow range of the environmental tolerance and therefore are by their nature more seriously endangered than adaptable species.

Apart from special status species, like endemics and relics, for preserving and protection of the species diversity of great importance are species demonstrating regressive tendencies, i.e. species to some or other degree endangered. In Poland so far 2 769 species have been ranked among the group of endangered species, including 2 618 species of invertebrate animals and 151 vertebrates. However this list is incomplete, because on the one hand status of the individual species is dynamic and changing, on the other hand limited faunistic knowledge of many taxa makes impossible to determine their status both in whole and with respect to individual species. Comparison of existing lists of endangered animal species on the global or European scale with the lists of species endangered in Poland leads to the conclusion that some of species endangered in other areas, in Poland are in relatively of good condition.

To this group, among other, belong ants species: *Formica polyctena*, *Formica pratensis* and *Formica rufa*, by the majority of Western Europe countries placed in lists of endangered species, similarly to butterflies species *Euphydryas maturna* and *Eriogaster catax*, worldwide recognized as critically endangered, while in Poland they are in a little bit better condition and are ranked in the lower threat category. Also among vertebrates there are species which in Poland are in better condition than in other parts of their range. An example here can be the otter (*Lutra lutra*) which is regarded as endangered in entire Europe, whereas in Poland is reinvading almost the whole territory of the country.

In Poland, as worldwide, many threatening factors exist, and the majority of them are related to human activity. The causes of the threat are of twofold: direct and indirect ones. The direct ones consist of destroying given species by man as a consequence of variously motivated activities, so as: collecting and catching animals for consumption or commercial purposes, acts of the vandalism, etc. The list of species thus endangered is, however, much shorter than the list of species eliminated in the indirect manner (e.g., amongst land snails only one of several dozen endangered species is endangered directly).

There are many causes of indirect threats. However, generally they all result in destroying or transforming various types of environments being natural habitats of individual species, and in case of parasitic species main risk here is the threat of dying host species.

The most threatened with extinction due to transforming or transformed environments are low adaptable species, of closely defined requirements – the so called stenotopic species. A significant proportion of these species is connected with disappearing and endangered ecosystems. In Poland those are, inter alia. depending on pure water species inhabiting water basins of various type, e.g. mayflies (*Ephemeroptera*), dragonflies (*Odonata*), stoneflies (*Plecoptera*), sponges (*Porifera*), snails (*Gastropoda*) and bivalves (*Bivalvia*). In land ecosystems that applies mainly to all species connected with endangered habitats – peat bogs, riparian forests and alder riparian forests, with wet and humid meadows, dry and thermophilous habitats, and in the next place with fir and spruce forests.



Amphibians (*Amphibia*) and reptiles (*Reptilia*) are modestly represented in Poland fauna, as well as in the rest of European continent. In the country 18 species of amphibians and 9 species of reptiles are found. All species demonstrate more or less dynamic long lasting downward trend. On the red list of endangered species have been placed four species of amphibians and four species of reptiles. The most endangered species in Poland include: (*Lacerta viridis*), (*Elaphe longissima*), European pond terrapin (*Emys orbicularis*), smooth snake (*Coronella austriaca*), northern crested newt (*Triturus cristatus*), *Rana dalmatina*, Carpathian newt (*Triturus montandoni*). An essential threat to above species is shrinkage of aqueous-muddy areas due to draining. Moreover another special threat to the native fauna is increasing presence of alien elements. In the last years have been observed many cases of private import of reptiles from republics of the former Soviet Union and southern Europe. Although since December of 1991 introducing that kind of animals species into the natural environment is legally forbidden, some of them are being dropped within cities, parks and wooded areas. Most often those are: *Agrionemys horsfieldii*, *Testudo hermanni*, *T. graeca*, *T. marginata*, *Lacerta viridis meridionalis*, *Trachemys scripta elegans*. In climatic conditions prevailing in Poland they can survive for a long time, constituting the competition for native species. Freeing alien specimens affects also European pond terrapin (*Emys orbicularis*).

Birds (*Aves*) are the most populous class of vertebrates in Polish fauna, their population equals 435 species, including seven species no longer observed after year 1951: Pallas's sea-eagle (*Haliaeetus leucoryphus*), bearded vulture (*Gypaetus barbatus*), willow grouse (*Lagopus lagopus*), calandra lark (*Melanocorypha calandra*), pied kingfisher (*Ceryle rudis*), rock sparrow (*Petronia petronia*), white-winged snowfinch (*Montifringilla nivalis*). At present 199 bird species are breeding migrants, from them 176 species are regular migrants with breeding nests on large areas, whereas remaining 23 species have been observed only locally and occasionally. Particularly, it concerns short-toed eagle (*Circaetus gallicus*), greater spotted eagle (*Aquila clanga*) and golden eagle (*A. chrysaetos*). It is assessed that 142 species appear irregularly (occasional migrants). In the group of irregular migrants 42 species are sporadic visitors, observed in Poland maximum three times. From the midst of birds found in Poland, four species introduced by man (deliberately or by chance) created self-supporting populations. They are: two irregular migrant species - Canada goose (*Branta canadensis*) and mandarin (*Aix galericulata*) and two breeding regularly in the country - pheasant (*Phasianus colchicus*) and urban pigeon (*Columba livia form urbana*).

In the midst of 14 orders of birds represented in the country, the richest in species are: (*Passeriformes*) - 166 species (in this number 88 regularly breeding), *Charadriiformes* - 94 species (16 regularly breeding), *Anseriformes* - 43 species (12 regularly breeding), *Falconiformes* - 37 species (15 regularly breeding) and *Ciconiiformes* - 37 species (10 regularly breeding).

In the Polish Red Book and in the red list of endangered species 70 bird species have been placed. Moreover, next eight species of poorly recognised status and stated, but undefined threat have been listed. In the class of birds, 10 species have become extinct within present borders of Poland, the greatest loss being here extinction of the remains of the Polish population of the great bustard (*Otis tarda*) in late 80s. 16 species have been found critically endangered or on the border of extinction. In the midst of Polish birds the most endangered order is counting 7 species of *Galliformes*, with 5 species on endangered species list. Three orders, *Falconiformes*, *Strigiformes* and *Gruiiformes* are also seriously endangered what is reflected in almost half of the

species being on the red list. However, the status of the species has been improving since the time protective zones around their nests have been established. Additionally, at threat is the occurrence of the whole order *Upupiformes*, represented by one vanishing species – hoopoe (*Upupa epops*). Similarly, order *Coraciiformes* is considerably threatened as two of four species found in Poland the European Bee-eater (*Merops apiaster*) and European roller (*Coracias garrulus*) are close to extinction.

The class of mammals (*Mammalia*) is being represented in Poland by 105 species belonging to 8 orders, the richest in species are orders: *Rodentia* – consisting of 38 species and subspecies and bats (*Chiroptera*) – 22 species. In the midst of the domestic mammals fauna, approximately 1 / 3 species is endangered, whereas four species vanished entirely: auroch, tarpan, European mink (*Mustela lutreola*) and European souslik (*Spermophilus citellus*). Additionally lately the group „of losing species ” has been joined by species considered as common: for example European hare (*Lepus europaeus*) and black-bellied hamster (*Cricetus cricetus*).

Moreover at an extreme threat is Tatra chamois (*Rupicapra rupicapra tatrica*) which in Poland reaches the north border of its geographical range, similarly small and isolated populations of garden dormouse (*Eliomys quercinus*). However reintroduced European beaver (*Castor fiber*), rebuilt significantly its populations, becoming in some areas of Poland a problem for the economy and wildlife conservation. A serious problem is also occurrence of expansive new alien species, posing a threat to native ones. That is exemplified by the raccoon dog (*Nyctereutes procyonoides*) and American mink (*Mustela vison*), which after has filled the ecological niche of the native mink and now is found in almost the entire territory of north Poland

### **Monitoring of habitats and wild species**

The current research findings as well as the results of monitoring breeding birds, natural habitats and species, covering all species and habitats of priority to the European Community, together with the assessment of the conservation status are available on the website of the Chief Inspectorate for Environmental Protection ([www.gios.gov.pl](http://www.gios.gov.pl)).

Plant monitoring has shown that presently populations of plant species on the national scale are not threatened in an important way although adverse changes might take place in the future. That is particularly likely in the case of species living in a very low number of locations. Condition of populations of species covered with the monitoring was assessed as favourable in 48% of locations, as unfavourable-inadequate in 33% of locations and as unfavourable-bad in 15%. Condition of habitats was assessed as favourable in 44% locations, as unfavourable-inadequate in 39% and unfavourable-bad – in 11%.

The monitoring research carried out under The State Environmental Monitoring System in 2006-2008, that is, monitoring of habitats and species, has shown locally considerably varied state of conservation status for 20 natural habitats covered with the monitoring, including all the priority ones. According to the preliminary assessment of 18 habitat types in the continental biogeographic region, a single habitat is preserved at the level close to favourable, 11 - at the unfavourable-inadequate level, close to unfavourable-bad – 3 habitats, unfavourable-bad – 3 habitats; in the Alpine region state of just two habitats was assessed as favourable, 5 – unfavourable-inadequate, 3 – unfavourable-bad.

#### ***Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland***

Under the monitoring, detailed data in numbers have been collected for 107 bird species (of 234 breeding species in Poland) monitored in 2000-2008 (or 2001-2008). Average annual rate of changes in the population numbers in that group equalled 1.016. That means an average increase in the number of an average species representing the group by 1.6% per year. For 32 species a significant increase in numbers +3% per year has been recorded, and for 14 strong decreasing trend were recorded (-3% or more per year).

Changes in indicator species of rural landscape birds included in the Farmland Bird Index 23 (FBI 23) initially showed a decrease by 15% in 2000-2004, and then improvement – a period of a slow increase in the index (2005-2007), and in 2008 – rapid return to the initial level of 2000.

For 14 of 20 monitored animal species their status might be assessed not only in the sites and areas under analysis but also throughout Poland. Aiming those species just four are in favourable conservation status, condition of 9 species was assessed as unfavourable-inadequate and one – as unfavourable-bad.

Information on condition of species and habitats in relation to Article 17 of the Habitats Directive currently being implemented in Poland are available on the website <http://biodiversity.eionet.europa.eu/article17>. The report shows that conservation status of 21% types of natural habitats indicated in the Habitats Directive is favourable, 52% - unfavourable-inadequate, and 24% - unfavourable-bad. As regards species indicated in the Directive, favourable conservation status was found for 30%, unfavourable-inadequate – for 34, and unfavourable-bad – for 17%.

#### **Cultivated plants**

Over 50% of the total area of Poland (16,2 million ha) constitute agricultural lands. Orchards constitute 337 thousands ha, meadows 2497 thousands ha and pastures 774 thousands ha. Polish agriculture is characterized by considerable fragmentation of holdings, by relatively low use of industrial means of production and poor quality of soils. Poland is an important producer of the wheat, rye, triticale, barley, maize, soft fruit and the vegetables (cabbage, onion and carrot). Poland is also the European leader in the production of apples in orchard cultivations. Cereal crops are cultivated on 73% of total sowing area.

As a result of excluding light soils from cultivation of extensive areas and simplifications in crop rotation, cultivation of following species is being abandoned, including: the millet (*Panicum miliaceum*), gold of pleasure (*Camelina sativa*), oil-yielding rape (*Brassica campestris var. typica*), sainfoin (*Onobrychis viciaefolia*) and others. Cultivation of *Secale cereale var multicaule* has been completely abandoned (in the past it used to be cultivated in the Podhale region). Similar situation is typical of Polish varieties of forage grasses and papilionaceous plants, which were bred from self-set ecotypes and local populations. Many species from this group of plants already are withdrawn from the cultivation or are cultivated in a very limited range, like e.g. kidney vetch (*Anthyllis vulneraria*), bird's foot trefoil (*Lotus corniculatus*), Alsike clover (*Trifolium hybridum*) and many species of grass, which several dozen years ago were still recommended as components of meadow and pasture blends e.g. the meadow foxtail (*Alopecurus pratensis*), Poa palustris, golden wild oat (*Trisetum flavescens*).

## **Livestock**

Genetic resources of farm animals held in Poland are very diversified, the majority of species being represented by a dozen or so races, varieties and lines. The breed structure within individual species is known only in relation to animals registered in a breed registry. However in the mass breeding in Poland there are no at present available tools allowing for an undoubted assessment of the breed structure of animals. Approximate data can be obtained with different methods, most often by transferring the structure of the active population to the mass population and analysing the use of the breeding material or by determining the stock in traditional breeding areas. In exceptional cases, e.g. of very valuable material included in the conservation programme, the entire population of the given race is covered with the performance control. The best method, recommended by the FAO, is including the breed structure of individual species during general censuses.

In 2008 in Poland were being held altogether 5 756,7 thousands heads of cattle, in this 2 806,5 thousands of cows (Central Statistical Office - CSO 2008). Most of cows, 97,8 % are milk type cows. Performance assessment carried out in 2007 covered 20,22 % heads of cows, with the dominating proportion 93,56 %, of Polish breed Holstein-Frisian of black and white variety, next Polish breed Holsetin-Frisian of red-white variety (3,00 %), and Polish simental (1,13 %) (Polish Federation of Cattle Breeders and Milk Producers - PFHBM, 2008). The group of remaining breeds (2.3 %) includes native breeds: Polish red, Polish black and white and red-white and white-backed cattle and imported breeds: montbeliarde and jersey.

In Poland no native breed of meat type cattle was produced. After introducing in Poland in year 1994 Programme for the Development of Beef Cattle Breeding, it resulted in importing and developing populations of all sorts beef breeds, propagation of commercial crossing and wet system of calf productions. In spite of plans of focus Polish breeding on 4 – 6 breeds, still 13 breeds of beef cattle are being bred (angus black and angus red, blonde d'Aquitaine, charolaise, hereford, limousine, marchigiana, piemontese, salers, meat simentaler, welsh black, and from 2006 also highland cattle and galloway. Pure breed heifer population counts 14 545 individuals; with dominating breeds of limousine (51.2 % of pure breed heifers), charolaise (18.2 %) and hereford (17.3 %) (Polish Association of Beef Cattle Breeders and Producers - PZHiPBM, 2008).

The domestic stock of horses in 2008 included approximately 325 thousands of horses (CSO 2008); in this number over 84 thousands horses were registered in the studbooks. The largest proportion constitutes Polish cold-blooded working type horses, from their population two native types were distinguished, Sokółka and Sztum horses. Among the hot-blooded horses, the most significant are the following Wielkopolski, Małopolski, Silesien and Polish half bred. Primitive native breeds - Polish konik and hucul - constitute only very small percentage of stock, similarly as pure blood Arabian horses and English full blood horses. Moreover imported horses of all sorts of breed are used to a small extent.

In 2008 the stock of sheep numbered merely 323,6 thousands of individuals, whereas in 1986 when they were close to 5 million and in 1991 – 1 551 thousand (CSO 2008). In 2007 proportion of ewes registered in studbooks constituted 34,4 % of the stock (Polish Sheep Producers Association - PZO 2008). In spite of such drastic reduction in population numbers, diversity of sheep genetic resources is greater than that of other species. In 2008 there were 27 breeds, 6

synthetic lines and numerous prolific program material, with the  $\frac{3}{4}$  participation of the parent breed and  $\frac{1}{4}$  of the prolific breed (PZO, 2008). The greatest proportion in the breed structure constitute parent breeds: Polish merinos (21 %), Polish mountain sheep (14,5 %) Polish lowland sheep (10,9 %) and longwool sheep: Pomeranian and Kamieniecka (9,7 %). Numerous imported paternal breeds, in the meat type constitute 18,1 %. Within these species 13 native breeds are under conservation programmes.

The stock of goats in Poland numbered only 136,1 thousands in year 2008 (CSO 2008). Presently, there are two native breeds: white improved and colourful improved and imported populations of dairy goat breeds: Saanen, Alpine, as well as small herds of meat goat breeds: Boer and Anglo-Nubian. The active population is very small, with only 1 215 individuals under performance recording in year 2007 (PZO, 2008). In mass breeding there is a large proportion of no breed goats of indigenous populations and their mixtures. For a few years the program for the reconstitution of the native Carpathian goat has been underway.

Stock of pigs in 2008 equalled 15 425,3 thousands individuals, including 1 366,8 thousand of sows (CSO 2008). In mass breeding and in the active population two parent breeds are predominating: Polish zwisloucha white and Polish large white, constituting 51,4 % and 35,7% , respectively, of 19 345 thousands sows under performance recording (Polish Association of Swine Breeders and Producers - POLSUS, 2008). For commercial crossbreeding, imported paternal breeds are used: most popular ones being Pietrain and Duroc, and to a lesser degree Hampshire and synthetic paternal line 990 produced by the National Research Institute for Animal Production (Instytut Zootechniki). Populations of three native breeds - Pulawska, Zlotniki white and Zlotniki spotted, albeit dynamically developing, are still small and included genetic resources conservation program.

In 2008 the population of poultry in Poland totalled 145 496 thousands of fowl (hens, geese, ducks, turkeys and other) (CSO 2008). Production of the gallinaceous poultry is largely based on imported genetic material, laying hens of domestic breeds are being used for the eggs production only to a limited extent. Import of parent flocks of breed and meat type hens and turkeys started in seventies and they quickly ousted the domestic breeding material. However in the case of the aqueous poultry, ducks and the goose, the production is based in whole on domestic breed material of high performance.

In Poland 8 species of fur animals are being bred: the common fox, arctic fox, mink, breeding polecat, raccoon dog, nutria, chinchilla and rabbit. Within these species numerous colourful varieties exist, and among rabbit additionally breeds exist (17 being actively improved). In case of fur animals considerable majority of genetic resources comes from imports, domestic resources include: pastel fox, white-necked fox, Popielno rabbit, beige chinchillas and breeding polecat.

Genetic resources of fish include numerous species; breeds program covers in the first place: carp (over 20 lines) and trout (two strains, of spring and autumn spawning). At present breeding of other fish expands, they are produced in ponds, basins or net cages (e.g. African and European catfish, Nile tilapia, sturgeon, lavaret) and species reproduced first for fry stocking of natural waters, as the trout, lavaret, European whitefish, pike, pikeperch, barbel, nase.

*Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

In Poland 8 species of bees are bred: Italian, Krainian, Caucasian and Central-European. The apiarian production is based on locally adapted mixtures of commercial breeds, mainly Krainian and Caucasian which fits by functional type to terrain conditions, i.e. to the type and structure of nectar. Native populations of Central-European bees: Augustowska, Kampinowska, North and Asta are covered by genetic resources conservation programme.

### **3. CURRENT STATUS OF NATIONAL BIODIVERSITY STRATEGIES AND ACTION PLANS**

The direct basis for the report and, in the future, also for the update of *National Strategy for Conservation and Sustainable Use of Biological Diversity* was Art. 35, Paragraph 2 of the Act on Nature Conservation of 16 October 1991 obliging the minister in charge of environmental issues to draft such a document and a relevant action plan. The clause has also been included in the current nature conservation act passed by Parliament on 16 April 2004.

In 1995 the *National Strategy for Conservation of Biological Diversity* was drafted, and in years 1996-1998 the Strategy and Action Plan, covering all the sectors of national economy, was developed. Ultimately, the document was adopted by the Council of Ministers on 25 February 2003 and then it was published in Polish and English.

In compliance with generally adopted principles of building the strategy, the document drafting process included the following stages:

- synthetic diagnosis of the status of biological diversity in Poland that consisted of a general assessment of current biological diversity, including assessment of natural environment transformation trends so far and the dynamics of changes underway as well as identification of conflicts and problem areas. Moreover, current and potential (future) internal and external preconditions were assessed;
- formulation of a proper strategy that would present the desired vision of status of nature (biological diversity) to be achieved within set timeframe in result of the actions specified in the document and defining the ways to achieve the status through attaining the set of strategic and operational objectives.

In formulating recommendations for *National Strategy*, the sectoral approach was adopted. It applied the recommendations to individual state administration sectors. The *Strategy* was appended with the *Action Plan* that provided terms of completion for the operational objectives.

The *Strategy* was addressed primarily at various levels of state administration (and their subordinate units) and local self-governments, that is the authorities that directly manage natural resources in Poland or deal with issues that can have considerable impact upon the state of environment. However, attaining the *National Strategy* objectives requires involving all the decision-makers, supporting bodies, and the whole society. Therefore, besides the authorities, other relevant stakeholders that participate in implementing the *Strategy* include: research and development entities, education facilities, zoological and botanical gardens, museums, business entities, and mass media. Particular role in the process is played by social organizations and groups that, on the one hand, monitor what authorities do and, on the other, actively participate in the *National Strategy* implementation process.

Furthermore, it was assumed that the supreme goal and strategic activities defined in the *National Strategy* were of timeless nature and should be an inherent element of state policy. That also applied to a host of operational activities, especially those that focused on continuous improvement of efficiency, monitoring, conducting scientific research, etc. However, some

*Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

actions of one-off nature should be, when required and feasible, taken in the years to come. The resultant tasks should be incorporated into action plans successively developed, starting with a plan for years 2003-2006.

In total, the *National Strategy for Conservation and Sustainable use of Biological Diversity and Action Plan* adopted by the Council of Ministers on 25 February 2003 defined four strategic goals and 57 operational objectives, which were elaborated in the *Action Plan* into 95 tasks for years 2003-2006. Each of the tasks included:

- priority on a three-level scale: 1) obligatory tasks; 2) recommended tasks; 3) postulated tasks (that is the tasks that predominantly depend on financial, organizational or substantive capacity);
- organizational units in charge of the task;
- entities suggested to take part in carrying out the task;
- desired performance timeframe;
- estimated cost;
- potential sources of financing, including both budgets of the units in charge and non-budget funds available.

However, since *National Strategy and Action Plan* came into force in February 2003, nature conservation circumstances have significantly changed, mainly as result of Poland's accession to the European Union, but also due to social and economic changes. Thus, it was necessary not only to develop new *Action Plan* for the next period but also to verify and update the strategy's provisions. The amended version was adopted by the Council of Ministers on 26 October 2007.

As a result of the amendment, the supreme goal was extended in order to put emphasis on the fact that biological diversity conservation in Poland should take into account the needs of Poland's social and economic development, ensuring proper living and social development conditions. Four additional strategic goals were formulated. They addressed international cooperation, education, use of biological diversity and improvement of nature protection mechanisms and instruments. Attaining all the eight strategic goals will require achieving 77 verified and amended operational objectives set for 17 state administration sectors. *Action Plan for Years 2007–2013* stipulated 134 tasks, each with detailed executive requirements. Those included both activities continued from the previous programming period and the new tasks stemming from the current international obligations and national needs.

The current document stipulates that all the activities in all the fields (economic, research and development, legal, and educational) should support the supreme goal, namely:

**The preservation of the riches of biodiversity at local, national and global levels and ensuring the possibilities for the development of all the levels of its organisation (within species, between species and at the higher-than-species level), while taking into account the needs of Poland's socio-economic development and the need to ensure the appropriate conditions of life and development for its society.**



Actions supporting biological diversity conservation must encompass the whole of nature, irrespectively of the form of use (areas subject to protection and economic utilization) and the degree of its transformation or damage. Use of biological diversity necessary for further social and economic development should be sustainable and should ensure undeteriorated availability of access to natural resources for future generations.

Attaining the supreme goal requires achieving eight strategic goals of equal priority:

- to identify and monitor the state of biological diversity and existing and potential threats;
- to eliminate or limit threats to biological diversity more efficiently;
- to preserve and / or enrich the existing and restore lost biological diversity components;
- to fully integrate biological diversity conservation activities with economic, administrative and social (including NGO's) activities that impact it, while observing the right proportions between national environmental protection and social and economic development;
- to promote social awareness and foster attitudes and activities supporting conservation and sustainable use of biological diversity;
- to improve mechanisms and instruments supporting conservation and sustainable use of biological diversity;
- to foster international cooperation on a regional and global scale for conservation and sustainable use of biological diversity;
- to use biological diversity in a sustainable manner and with respect to fair and equitable distribution of benefits and costs of its conservation, including cost of desisting from development activities for protection of natural resources.

The objectives are attained using relevant legal, organizational, economic and financial mechanisms that condition behaviour and sustainable use of biological diversity resources. The provisions of the Strategy fully comply with the ones formulated in the Convention on Biological Diversity. The document acknowledges the absolute necessity to take actions for eliminating identified threats and reversing defined, negative trends in natural environment. Due to the need of adjusting the Strategy's provisions to requirements and executive conditions that change in time and to monitoring its implementation status, it is assumed that implementation activities would be regularly assessed.

Over last few years the activities aimed at attaining the strategic goals focused on the following undertakings that support the obligations formulated in the Convention on Biological Diversity and its Strategic Plan as well as the 2010 Target and Millennium Development Goals.

### **3.1 Identification and monitoring of the state of biological diversity and existing and potential threats**

Identification of the state of biological diversity and existing and potential threats is carried out by various bodies in Poland. Relevant works are performed by both specialized state agencies, research and development institutions, and certain social environmental organizations.

Important sources of knowledge on Poland's state of biological diversity include monitoring research and observations carried out as part of the State Environmental Monitoring System, one of basic tasks of the Chief Inspectorate for Environmental Protection.

First attempts of implementing nature monitoring as a subsystem of the State Environmental Monitoring System were made in years 1996-1998. The scope was limited to a few selected components, such as endangered plant species in over 80 nature reserves, ecosystems of a few dozen lakes of diversified trophic state and ichthyofauna of two large rivers. The gained organizational and methodological experience sufficed for launching a more comprehensive program in years 2000-2002. This time the scope covered land ecosystems (forest and non-forest habitats) and water ecosystems (lake and river habitats) as well as species of vascular plants, lichen, fungi, invertebrates (Carabidae) and vertebrates (fish, amphibians, reptiles and mammals). The observations were conducted in both natural environment and semi-natural environment (national parks) of insignificant anthropogenic damage as well as in areas representing nature related to main types of land use (commercial forests, agrocenoses). Moreover, efficiency of protection in reserves was analyzed. In 2006 the monitoring activities underwent considerable reorientation. Obligations resultant from Poland's accession to the European Union significantly extended the scope of monitoring of birds and species and natural habitats, mainly those specified in Appendices to the Birds and Habitats Directives.

Currently, observations and research of the state of biological diversity conducted under the State Environmental Monitoring System program cover the following blocks of issues:

#### **Monitoring of birds**

Bird monitoring is to annually provide information representative for the territory of Poland on the state of population of selected nesting species, including population size, abundance and reproduction effectiveness.

Currently nesting birds are monitored in Poland as part of a system of single programmes dedicated to specific bird groups or individual species. Every subprogramme uses methodology adjusted to specific traits of the monitored bird group. In years 2007-2008 the system consisted of the following 11 subprogrammes:

- monitoring of common species, including nesting birds;
- monitoring of semi-rare species, including flagship species and wetland birds;
- monitoring of rare species, including predatory birds (golden eagle, spotted eagle, and osprey), whooper swan, pochard, dunlin, and Mediterranean gull.

In total the monitoring covered nesting bird populations of about 140 bird species, including 40 species from Appendix I of Birds Directive. In total, birds were counted in 870 study areas of the

following sizes: 1 km<sup>2</sup> and 100 km<sup>2</sup>, including 7 species monitored on an individual basis in all known nesting habitats. The project involved 470 highly skilled observers. (See Chapter 2 of this report for information on the results of monitoring of birds).

### **Monitoring of species and habitats**

Launched in 2006, the monitoring research covered selected species and natural habitats (20 animal and 16 plant species, 20 types of natural habitats), mostly subject to the European Community's special care, that is so-called priority species and natural habitats. The project was carried out in selected areas across Poland, many of which were Natura 2000 special areas for habitat conservation. Natural habitats were monitored in 1 538 study areas, plant species - in 123 study areas and animal species - in 746 study areas. The project involved about 190 persons.

Also the areas studied in years 2000-2002 were included. The research incorporated, among others, assessment of the condition of species populations and habitats, and, in case of natural habitats - assessment of conservation status of their structure and function according to the criteria for assessment of preservation as adopted in the Habitats Directive. Other data collected included information about the current and future impact on species / natural habitat and about nature protection activities underway in the area as well as their effectiveness.

An important new element was introduced to monitoring: a system for assessing the state of conservation and its parameters (so-called conservation status and its parameters specified in the Habitats Directive) for species and natural habitats at site and area level and, in case of a representative number of areas, at the biogeographic region level.

The monitoring works were organized at three levels by establishing the Coordinating Institution (Institute of Nature Conservation at Polish Academy of Sciences), national coordinators, and local experts. As specified in the adopted delegation of duties, the Coordinating Institution was in charge of all the monitoring activities, appointed national coordinators, developed instructions for completing field reports, supervised the results and aggregated data. The monitoring research methodology was developed for projects, species / habitat types by national coordinators in cooperation with the Coordinating Institution and it was them who managed local experts conducting field research.

Based on available expertise and preliminary monitoring findings (from years 2006-2007) the monitoring programme preliminarily estimated the conservation status of all the items listed in the Habitat Directive Annexes and present in two regions of Poland: 20 plant species and genera, 105 animal species, and 40 types of natural habitats. The assessment was included in the report for the European Union on implementation of the monitoring part of the Habitats Directive. It covered, among others, identifying and assessing the nature conservation status parameters, i.e.: range, future prospects, habitat of species, population, an area occupied by natural habitat, and structure and function of natural habitat.

### **Monitoring of forests**

Monitoring of forests as a separate subsystem of the State Environmental Monitoring System was carried out from 1991 to 2007, when it was incorporated into the nature monitoring subsystem. It is a system that makes it possible to assess the state of the forest environment and health of

#### ***Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland***

tree stands based on continuing or periodic observations and measurements of selected indicators in permanent observation areas. Tasks of the forest monitoring include, in particular:

- defining spatial distribution of damage levels;
- identifying trends of tree stand deterioration changes in time;
- analysis of cause and effect relationships between forest health status and biotic and abiotic environmental factors;
- developing short-term forecasts of forest health state changes;
- fulfilling Poland's obligations coming from the Convention on Long-range Transboundary Pollution, Convention on Biological Diversity and Strasbourg and Helsinki resolutions adopted at the Ministerial Conference of the Protection of Forests in Europe;
- collecting information about the state of forests, useful in formulating national forest and environment policy;
- providing relevant information to state and local administration, society and State Forests administrative units.

In 2007 the observations covered 1910 Permanent Observation Areas of Class I (2200 POA's planned, 290 areas being scheduled for future) and 148 POA's of Class II. Those included, among others, observation of morphological features of selected trees' crowns, identification of tree stand damage symptoms, and, in case of some POA II, additional examination of air pollution deposits, monitoring of under-crown precipitation and soil solutions as well as meteorological parameters.

#### **Integrated Monitoring of Selected Ecosystems**

In 2006 Integrated Monitoring of Selected Ecosystems Program conducted as part of the State Environmental Monitoring System since 1993 was incorporated into the nature monitoring subsystem. Currently observations and studies are carried out in 7 river basins representing basic types of Polish landscape and covering, among others: meteorological measurements, air pollution analyses, under-crown precipitation and flow down the trunk chemism analyses, analyses of sulphur and heavy metals content in lichen, level measurements and chemism analyses of underground and surface waters (watercourses and lakes), observations of lichen thallum surface variability (tree epiphytes) and observations of epigeic fauna.

The recording and analysis of short-term and long-term changes in ecosystems caused by climate changes, pollution, and other anthropogenic factors is to, among others, help in determining matter and energy circulation mechanisms in basic types of geoecosystems in Poland and defining the types and nature of threats encountered.

Irrespectively of the observations carried out under the State Environmental Monitoring System, information about the state of biological diversity is obtained from another important source, namely research conducted by science centres. Works on the subject are currently performed by a few Polish Academy of Sciences institutions and over sixty faculties of higher education institutions. The most often studied structural components of animate nature are plant and animal populations analyzed *in-situ* and plant communities, societies, biotopes, and biocenoses. A

relatively few projects focus on research conducted at large ecosystem levels, such as: ecosystems, natural landscapes and landscape structures (ecological corridors).

Ecological processes that impact the state of biological diversity are also subject to research projects conducted by science studies operating at some national parks. Valuable information is also provided by works on development of management plans for protected areas and inventories of the state of environment regularly prepared by State Forests National Forest Holding.

Moreover, certain social environmental organizations are very active in determining the state of biological diversity and existing and potential threats. Depending on their interest, they conduct research mainly on population size of selected plant and animal species. It concerns particularly birds: significant observations have been made by such organizations as Polish Society for Protection of Birds, Polish Society for Birds Protection, and many other.

### XXX

Works on determining and monitoring the state of biological diversity and existing and potential threats, contribute to fulfilling the obligations formulated in Article 7 of the Convention on Biological Diversity as well as to achieving The 2010 Target and Millennium Development Goals. However, although the number of institutions that deal with state of environment recognition is high, there is no system that would ensure effective coordination of their activities. What is particularly lacked is complete and up-to-date nature inventory of Poland. For some taxonomic groups the data is aggregate for the whole country (for instance ATPOL Atlas of Polish Flora for vascular plants, distribution atlas of butterflies, mammals, birds), in other cases there is only local occurrence data. However, there is a clear lack of exhaustive spatial inventory of plant communities in an organized form an atlas would ensure. Spatial data gathered by numerous institutions, addressing either selected areas of the country or regarding only selected types of plants, were collected using various methods and are often not comparable or give incomplete or even misleading picture of actual state.

In result, there are areas of Poland recognized in great detail and areas for which the biological diversity state knowledge and its threats is residual and random. Due to numerous reorganizations and relatively narrow subject scope, limited is the extent nature monitoring, as a subsystem of the State Environmental Monitoring System, performs the role of an instrument warning against threats to biological diversity and supporting the remedial decision making process.

## **3.2 Effective elimination or reduction in threats to biological diversity**

In addition to the actions directly aimed at nature conservation, the state of biological diversity relies upon actions taken in other fields of environmental protection. It applies particularly to measures taken for protection of air and waters.

### **Air protection**

In last two decades Poland has made the greatest progress in air protection, advancing from sulphur-polluted and dusted country to a relatively pure country with just local aero sanitary

problems, resulting predominantly from municipal or mobile sources. In most of Poland's territory, the condition of air is presently good. In Poland, the type of basic pollutants emitted into air depends, most of all, on the type and amount of fuels used. The most important and most common pollutants are: particulate matter PM10, sulphur dioxide and nitrogen oxides, and ozone. The pollution is due to the types of fuels combusted and power generation plants. For years, Poland has been using mainly hard or brown coal (approx. 70% of the generated power originate from those fuels). The main human-related sources of air pollution are the following: commercial power industry and power production at manufacturing plants, some industrial technologies, municipal combined heat and power plants and boiler plants, transport (mainly road transport) and local sources of so-called low emission.

Significant impulse for taking actions aimed at air protection was provided when Polish Government adopted such documents as: *Poland 2025 – Long-term Strategy for Sustainable Development* and *National Spatial Development Policy Concept*. In the late 1990s, also a number of documents on Polish power industry was prepared. To various extent, they covered environmental issues, too. Those included, in particular: *State Policy Provisions for Rationalization of Energy Consumption in the Municipal Sector*, *Assumptions of Polish Energy Policy until 2010 and 2020*, Energy Law and Act on Support for Thermomodernization Undertakings. The assumptions for Polish energy policy until 2010 and then until 2020 focused not only on national energy security but also on ensuring environment conservation, particularly with regard to minimizing adverse impact of energy industry on state of air, including, inter alia, prognoses related to power industry and incorporating a significant decrease in pollutant emission by 2020.

At the same time, EU mechanisms for air quality management have been regulated by the following legal acts:

- Council Directive 96/62/EC on ambient air quality assessment and management;
- Council Directive 1999/30/EC of 22 April 1999 relating to limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air;
- Directive 2000/69/EC of the European Parliament and of the Council of 16 November 2000 relating to limit values for benzene and carbon monoxide in ambient air;
- Directive 2002/3/WE relating to ozone in ambient air;
- Council Decision 97/101/WE establishing a reciprocal exchange of information and data from networks and individual stations measuring ambient air pollution within the Member States;
- Directive 2004/107/WE relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air.

The Framework Directive along with the derivative ones has been implemented into the Polish legal system through the Act of 27 April 2001. – Environmental protection law (Dz. U. Nr 25 poz. 150) and respective executive acts. Additionally, on the 11th of June, 2008, Directive 2008/50/WE of the European Parliament and Council of May 21 2008 on ambient air quality and cleaner air for Europe(CAFE) has come into force. It implements new mechanisms for managing air quality in zones and agglomerations. The main function of the Directive is to

introduce new standards for air quality with respect to particulate matter (PM<sub>2,5</sub>) in air and verification and consolidation of the existing EU acts on air protection (Framework Directive 96/62/EC, 99/30/EC, 2000/69/EC, 2002/3/EC).

In 2001 a completely new version of *Environmental Protection Law* act was passed. It defined fundamental air protection issues. Adoption of *Strategy for Development of Renewable Energy* by the Parliament was particularly important. It increased the share of energy from renewable sources in fuel-energy balance of the country from 7,5% in 2010 to 14% in 2020, which made it possible to significantly reduce pollutant emission of substances contributing to climate change and natural environment acidification. Equally important was the Parliament's adoption of *Strategy for Chemical Industry until 2010*. One of the goals mentioned in the document was significant reduction of gas and dust emission in result of enterprise restructuring processes, modernization of facilities and technologies and implementation of environment-friendly investment projects. Adopted in 2003 by the Council of Ministers, *Polish Climate Policy – Strategy for Emission of Greenhouse Gases until 2020* assumed that emission would be reduced by 30-40% in the period and that the main priority would be given to actions creating more climate-friendly consumer and producer behaviour patterns, thus restricting adverse effects of anthropogenic activity on the state of biological diversity. Principal factors influencing Polish climate policy are related to typical problems faced by countries at the stage of political and economic system restructuring. Those include:

- low profitability of companies, making it difficult to allocate financial resources necessary for urgent technical and technological upgrades. The situation is particularly difficult in many companies predominantly owned by the State Treasury;
- relatively low purchasing power of the society, limiting available options to politically least expensive measures of temporary nature, effects of which are mainly short-term, instead of the desired long-term perspective. Despite considerable improvement in years 2006-2008, difficult situation on labour market remains the main factor hindering betterment of financial standing of society;
- coal-oriented primary fuel balance, historically conditioned by access to own coal resources in Poland and the resultant social implications. The energy balance structure adversely impacts quality of environment, including climate change;
- excessive costs of operation in electric power engineering, gas industry and heat engineering related to incomplete freeing of the market.
- dynamic growth of motor transport.

Strategic directions and most important goals for Poland in air protection are currently determined by the following: *National Environmental Policy for 2003-2006 including Perspectives for Years 2007-2010* and its continuation for the next planning period. The documents stipulate, among others:

- permanent transition to eliminating pollution at source by switching to other energy carriers (with special emphasis on renewable energy sources), use of purer raw materials and technologies (according to the BAT principle) and minimizing consumption of energy and raw materials supported by standardizing emissions in industry, power engineering and transport;

*Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

- increasing the number of pollutants covered by actions aimed at reducing their emission (carbon dioxide, methane, nitrogen monoxide, HFC, sulphur dioxide, nitrogen oxides, ammonia, volatile organic compounds and ozone at the ground level, SF<sub>6</sub>, PFC and substances depleting ozone layer);
- consistent implementation of product standards limiting air pollutant emission with consideration to full product life cycles;
- extending local (levied by self-governments) regulations and principles of power management to reduce and eliminate the aero sanitary burden;
- fuels diversification and increase in gas consumption (which should, however, be accompanied by analysis of economic and social impact on domestic hard coal mining sector);
- development of unconventional power engineering.
- implementation of air protection programmes for zones in which acceptable and targets levels of certain air pollutants have been exceeded as shown by the air quality assessment within the framework of the State Environmental Monitoring System.

In result of consistent pursue of the goals and tasks specified and adopted in strategic documents and policies as well as implementation of a number of new regulations, emission of main air pollutants has been decreasing over last few years. Particulate matter emission has been successfully reduced by about three quarters, mainly owing to commercial power engineering that decreased the burden more than 8 times in years 1990-2008. However, significant share still comes (and reduction trends are not promising) from small stationary sources: local boiler plants, domestic and workshop fires, particularly in small towns and densely populated rural areas. Concentration of sulphur dioxide, nitrogen dioxide and particulate matter in the air in most areas covered by measurements in recent years were lower than permissible levels, particularly in case of annual average standards. Higher concentration of sulphur dioxide and particulate matter, sometimes exceeding permissible levels, is recorded mainly in industrialized regions in the south of Poland, particularly in cities making up the Silesian agglomeration. However, it is not the industry to be blamed for the situation but domestic fires, fuelled with coal of poorer quality, and coal dust. Local elevated concentrations of specific pollutants, such as polycyclic hydrocarbons, were also reported there.

Poland is still a country with considerable carbon dioxide emission. For years it has been at the level of 1,5% of global emission, which is excessive compared to the population and country territory (0,6% and 0,2%, respectively). Poland is also a significant emitter of carbon oxide (CO), which often results from still imperfect combustion technology, particularly in municipal sector. Non-methane volatile organic compounds (NMVOC) originate equally from both natural sources (environment) and transport. In 2004-2008 emission of organic compounds and very toxic polychlorinated di-benzo dioxines and furans continued to clearly decline. Moreover, emission of particularly hazardous heavy metals, i.e. cadmium, lead, and mercury, steadily decreased. However, asbestos hazards can still be locally found; most burdened areas include eastern Poland and Mazowsze.



Atmosphere improvement level is characterized by considerable spatial variability. To the least extent it can be observed in strongly urbanized and industrialized areas and in smaller towns characterized by denser land development, where so-called low emission from such coal-fuelled sources as boiler plants, stoves and domestic fires is particularly high in winter. Air is also more polluted along main communication routes.

Particularly important long-term administrative measures contributing to air protection include voluntary agreement on reduction of sulphur dioxide emission by 2010 signed by Ministries of Industry, Construction and the Environment. Power engineering sector was obliged to reduce SO<sub>2</sub> emission to half of the limit granted to Poland in *Second Sulphur Protocol* (which means a decrease to 700 000 tons annually and limiting the background value to below 20% of the standard). It seems that Poland will manage to reach the limit, which should be considered a great success in the battle for air purity in Poland. The produced effects are owed to development and implementation of domestic technologies and techniques and purchasing licenses for complimentary solutions. In result of a number of investment projects and organizational undertakings mining industry managed to considerably reduce the content of sulphur in coal used for power engineering, so the quality of the fuel systematically improves.

At present in most regions of the country, liquidation of low emission is becoming more and more urgent. Actions in the respect have been and still are successfully taken both in large cities (Cracow, Wroclaw, Upper-Silesian Industrial District, Opole) and in smaller towns, particularly in health resorts and places of recreational character. Typical undertakings of the kind include, first of all, replacing solid fuels (hard coal or lignite) with liquid fuels (light heating oil) or gas fuels, and use of heat networks instead of individual heat sources. Unfortunately, renewable energy sources are still introduced too slowly, especially zero-emission, most valuable in environmental terms: solar energy.

There are also measures taken to reduce emission from mobile sources. They focus on making technical standards for vehicles more rigorous. At the beginning of the 21st century the share of new cars in the total number of cars registered in Poland grew. Unfortunately, the accession to the European Union resulted in another wave of importing used cars that not always met environmental standards. A special instrument was launched to prevent the trend: differentiation of import charges dependant on the age of the vehicle.

Polish fuel industry is already capable of delivering environment-friendly fuels, virtually sulphurless and benzenless. However, a relatively high price is a barrier to their common use. Deliveries of low-sulphur Diesel oil for municipal transport in Cracow, Warsaw, Łódź, Plock, and several other cities have been started; moreover, ethyl gasolines and asbestos fibres used in brake pads until recently, have been eliminated. Air quality will also improve thanks to gradual replacement of vehicle fleets with those consuming less fuel and equipped with catalytic converters or gas-fuelled, and promotion of alternative means of transport (e.g., through building bicycle paths).

Actions for improvement of air quality are supported by non-budget designated funds: commune, district, provincial, National Fund for Environmental Protection and Water Management and EcoFund Foundation. National Fund for Environmental Protection and Water Management financially supports, first of all, implementation of state-of-the-art technologies,

particularly those contributing to decreasing energy consumption and rationalization of heating systems, production and installation of systems reducing emissions, use of unconventional sources of energy and implementation of cutting-edge technical solutions mitigating transport-related problems. The priorities adopted by EcoFund include activities related to reducing emission of gases contributing to climate changes and limiting trans-boundary transport of SO<sub>2</sub> and NO<sub>x</sub> from the territory of Poland through modernization of ineffective and environment-burdening coal-fuelled systems (geothermal systems, wind power plants, biofuels, etc.).

Another type of activities that may contribute to reducing the pressure of industry and municipal sector on air quality are legal-economic mechanisms based in, *inter alia*, other international conventions and the Community law. Those include, in particular:

- transferable rights, that is, trade in emissions;
- Joint Implementations;
- Clean Development Mechanism (CDM), i.e. technical and technological aid for developing countries in return for certified emission reductions;
- voluntary agreements of businesses for implementation of Eco-Management and Audit Scheme (EMAS) provisions.

Poland, as the European Union member country, has been obliged to participate in European trade in carbon dioxide emissions since May 1, 2004. The system, operating under Union Directive (2003/87/EC), is an important element that is to help the European Union member states satisfy the requirements concerning reduction of greenhouse gases in 2008-2012 adopted by the Kyoto Protocol. Poland's obligations specified by the document include reducing emission of greenhouse gases in years 2008-2012 by 6% compared to the base year of 1988.

Poland subscribes to the obligations assumed in 2007 pursuant to the European Council's decision to reduce total greenhouse gases' emission from the territory of the Community in 2020 by 20% compared to 1990. In years 1988-2006 the country already considerably reduced the figure by 28,9% in total (excluding land use, changes in land use and forestry), so it will meet the 6% target for the first period of the Kyoto Protocol (2008-2012).

Negotiations of the Energy and Climate Change Package (a package of four directives and decisions drafted by the European Commission) were one of Poland's key challenges after joining the European Union and focused predominantly on the most important Directive draft considering emissions trading scheme (EU ETS), which proved also most controversial. First of all, it regarded the EU Council's decision from 2007 to reduce total emission of greenhouse gases by 20% by 2020 compared to the base year of 1990. Poland's situation was unique because, faced with the global switch from coal to gas trend, the Government of Poland had to negotiate realistic conditions taking into consideration that Polish power engineering sector was coal-fuelled in 93%. The negotiations ended successfully and Polish national power industry was granted derogation of the EU ETS Directive until 2019.

According to the EU ETS Directive draft, in 2013 free quotas could cover up to 70% of the CO<sub>2</sub> emission from power engineering sector verified in years 2005-2007. In exchange for the free quotas, the industry would have to develop upgrade plans for systems used. That was one of the

components making up the base for the national plan of investments in modernizing and improving the infrastructure and technologies that are environment-friendly, and for diversification of power engineering structure and supply sources matching in value the market value of the free quotas and taking into consideration the necessity to reduce, as much as possible, energy price increases directly linked to the changes.

Emissions trading scheme in Poland is regulated by an act on trade in rights to emit greenhouse gases and other substances to the air passed in December 2004. The Act specifies the principles of the system and is to economically and effectively reduce the emissions. Levying the regulations poses another challenge to Polish businesses covered by the Community emissions trade scheme, especially from power engineering and ferrous metals production and processing sectors as well as mineral and paper industries, because it effectively encourages efforts to reduce the emissions.

Other important instruments include Poland's obligation to meet the provisions set out in IPPC Directive. In years 2004-2006 virtually all the large industrial plants responsible for substantial part of pollutants' emission into atmosphere were granted relevant integrated permits. There was also a debate on principles of agreeing best available reference technologies (BREF), particularly for coal power engineering. It relates to observing the 2001 EU Directive on Limitation of Emissions of Certain Pollutants into the Air from Large Combustion Plants.

Activities aimed at atmosphere improvement have significantly accelerated since 2007. It follows from subsequent launches of the *Infrastructure and Environment* and *Innovative Economy* operational programmes. Operational Programme *Infrastructure and Environment* provides support for investors carrying out such air-protection-related projects as: upgrade of heat plants to high-efficient cogeneration units, reduction of loses in power and heat distribution, construction of local power plants based on renewable sources, thermal modernization of public utility facilities, reduction of energy consumption in production processes, and implementation of best available technology (BAT). Total European funding for the projects is about 900 million Euro. Air protection undertakings covered by Operational Programme *Innovative Economy* focus mostly on improving businesses' innovativeness and include, among others, projects aimed at:

- limiting low emissions from municipal sources;
- promoting solutions that support eliminating or limiting emissions from transport and ensuring high quality of fuels;
- promoting and supporting development of renewable energy sources and technologies that facilitate effective use of energy and reduce economy's demand for materials;
- growing social awareness of needs for and options of air protection, including energy saving and use of renewable energy sources;
- fostering use of alternative fuels (such as biofuels).

For all the undertakings specified in Operational Programme *Innovative Economy* over 1850 million Euro is allocated for years 2007-2013.

### **Protection of water resources**

Poland is a country where water resources are rather small (estimated at 220 km<sup>3</sup>), including 62km<sup>3</sup> runoff. Annual per capita volume is 1580 m<sup>3</sup>, whereas the European average is 4560 m<sup>3</sup>, and global annual average volume of water resources per person is 7300 m<sup>3</sup>. There are only two countries in Europe where per capita water amount is smaller than in Poland, that is Belgium and Malta. Polish water resources per capita are similar to those of Egypt. Their availability varies depending on the region: the lowest values are recorded in the central, lowland part of the country and are estimated to be around 1000 m<sup>3</sup>. More generous resources occur in the lakeland region, where the volume of water per capita ranges from 1500 m<sup>3</sup> to 3500 m<sup>3</sup>.

Water management has long tradition in Poland. The first Water Law was adopted in 1922. However, before 1989 effectiveness of pursuing the tasks and duties set out in the Water Law of 1974 was rather low. Only introduction of free market economy that initiated the process of price and cost realignment and political and administrative actions started in early 1990s commenced gradual introduction of environment-friendly practices in water management. Changes in thinking patterns and approach to managing water resources resulted in passing new Water Law in 2001. Legal bases for managing freshwater resources have also been laid down in, inter alia, Act on Nature Conservation of 2004, Act on Collective Water Supply and Discharge of Wastewater of 2001, and Act on Spatial Planning and Development of 2003. Issues related to improvement in the state and management of water resources are also specified in a host of strategic documents. In *National Environmental Policy* of 1991 and in *II National Environmental Policy of 2001* as well as *National Environmental Policy for 2003-2006 including Perspectives for Years 2007-2013* of 2002 and its continuation for the period to follow the necessity of sound use and appropriate management of water is translated into a list of priorities, which include, among others:

- continuation of activities related to rationalization of water consumption;
- continuation of investment projects regarding construction of retention reservoirs;
- modernization of plants for treatment of river water;
- reduction of nutrient load discharged into water bodies through modernization, extension and construction of municipal wastewater treatment plants and collective wastewater systems as well as preventing increases in nitrogen load from agricultural sources;
- limiting loads of hazardous substances discharged to waters from industrial sources.

Developed and adopted in 2005 by the Council of Ministers of Poland, the Water Management Strategy formulated the following three objectives:

- to satisfy justified municipal and industrial needs of water observing, at the same time, the sustainable water use principles;
- to achieve and maintain good state of waters and, in particular, of aquatic ecosystems and ecosystems dependant on water;
- to improve the effectiveness of protection against flooding and drought effects.

*Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

The document addressed the contents of *II National Environmental Policy* of 2001 and *National Environmental Policy for 2003-2006 including Perspectives for Years 2007-2010*. The Strategy also covered activities supporting implementation of *National Programme for Municipal Wastewater Treatment* and activities undertaken by the Ministry of Agriculture and Rural Development, related to implementation of *Code of Good Agricultural Practice* aimed at elimination of water pollution from diffused sources. Moreover, the *Rural and Agriculture Development Strategy for Years 2007-2013* (with some forecast until 2020) adopted in 2005 set directions for actions impacting water quality.

To improve quality of water management, a number of legal and organizational measures have been taken. An important step was switching water resources management from administrative approach to river basin approach (within hydrographic borders). In 1991 Regional Water Management Authorities (RWMA) were established. The state administration bodies now manage water resources within their hydrographic areas. In 2006 National Water Management Authority (NWMA) was created. President of the National Water Management Authority is the central state administration body for issues related to water resources management.

The Council of Ministers approved the *National Program for Municipal Wastewater Treatment* (NPMWT) in 2003; it specified such undertakings as construction, extension and / or modernization of collective wastewater networks and municipal wastewater treatment plants until 2015. In 2005 *National Program for Municipal Wastewater Treatment* was updated and amended, incorporating proposals from municipalities and voivodship offices. The number of agglomerations that need to be equipped with municipal wastewater treatment plants and wastewater collection systems increased by 199. The investment projects listed in NPMWT will be carried out in 1577 agglomerations. They will require construction of about 37 thousand km of wastewater collection lines and building, extending and / or upgrading about 1110 treatment plants. That means an increase in funds required for the undertakings in revised NPMWT from 35 billion PLN to 42 billion PLN.

Poland's accession to the European Union resulted in, among others, activities aimed at transposition of Water Framework Directive to national regulations and starting the process of their implementation. The works related to WFD commenced in 2003. Those included, among others: developing river basin profiles, including definition of waters typology, designating uniform bodies of water, analysis of anthropogenic pressures and their impact upon waters, development and implementation of a water monitoring program, setting environmental objectives, final identification of significantly altered and artificial bodies of water and developing a program of their restitution. Moreover, the European Commission was supplied with reports of the activities in specific river basins (the reports were sent to the Commission in 2004, 2005 and 2007) and the required public consultations were carried out. Breakdown of the works required for implementation of Water Framework Directive in Poland and a relevant schedule were presented in a document entitled the *Schedule and Program of Works Related to Drafting Water Management Plans for River Basins and Breakdown of Actions to Be Taken as Public Consultations*. The final version of the document, so significant to hydrological bases of conserving biological diversity, was adopted after public consultations by departmental management in 2007.

In 2007 regional water management authorities (RWMA) verified the register of protected areas. According to WFD requirements, the register covers also areas designated for conservation of

habitats and species to which maintaining or improving water state is an important conservation factor.

Successive implementation of the provisions of the strategy and policy documents lead to measurable effects in water state improvement. Nonetheless, there is still a range of issues that require resolving as soon as possible. Availability of good quality drinking water remains not satisfactory, especially in small towns and rural areas (mainly due to excessive level of nitrates in shallow wells and other sources of potable water). Despite regular reductions of the amount of wastewater from municipal and industrial sources as well as using more effective methods of its treatment, the quality of water in rivers and lakes is still not satisfactory. Significant threats to water habitats include disturbances in natural water course regimes and ecological continuity of rivers, streams and their valleys as well as morphological changes in river beds and valleys. Many land melioration systems (mainly draining systems) built before 1989 in order to intensify agricultural production, unfavourably impact natural environment and contribute to biological diversity degradation. Shortage of hydrotechnical systems causes floods and droughts triggering severe economic losses. Irrespectively of the natural and technical causes, the growing flood risk stems from increasing the level of investment in areas prone to such hazards. The development of infrastructure and facilities is not followed by adequate legal and organizational changes related to development and use of areas susceptible to floods. A considerable difficulty in effective water management is posed by an inefficient uniform system of water management information system (water cadastre). Although the strategy and policy documents adopted the principle of sustainable use of biological diversity, in practice there are often conflicts in execution of hydrotechnical investment undertakings in environmentally valuable areas.

Poland's adoption of sustainable development as the basic principle for formulating social and economic policies, the country's obligations stemming from the EU's water policy, and awareness that problems related to sound use of water reserve have to be resolved provided the base for developing *National Strategy for Water Management 2030* (NWMS) that presents a concept of eliminating one of primary development barriers, namely degradation and availability of water resources unevenly distributed in space and time. The NWMS is both the outcome of efforts made to find best solutions for optimal management of water resources in Poland and a part of following the requirement to popularize the social approach to water resources management, so strongly emphasized in the Water Framework Directive.

Complete implementation of water resources management on a river basin level is a basic principle of the NWMS and it is to ensure meeting sustainable development functionality and safety criteria (sustainability of ecosystems, social acceptance and control of economic efficiency). Water reserve management should be continued following the river basin approach by state water administration bodies (NWMA, RWMA) using appropriate executive instruments. State administration will be responsible for comprehensive water policy and execution of NWMS at the national level, in water regions and specific river basins.

The reform's goals related to legal regulations include complete harmonization of Polish laws with EU water policy. All the national regulations have to incorporate the principle of managing water resources with the river basin approach and integrate water-related sectoral activities with local governments' actions taken in specific administrative units.

The reform stipulates creating a modern system for monitoring, exchanging information and controlling water resources management and according to provisions of relevant Community directives. The data bases existing in NWMA, RWMA and regional drainage and irrigation management bodies will be used as part of the water cadastre.

Detailed organizational solutions and executive instruments for the reform are to be developed in years 2009-2011; the stage of implementing the new solutions in the years to follow is to be centrally monitored and some of the objectives are to be attained in accordance with the regulations in force so far. That stage includes reforming regulations and economic and financial instruments. Equally important strategic objectives of NWMS are:

- achieving and maintaining good state and potential of waters and the related ecosystems;
- satisfying society's needs related to water supply;
- satisfying the economy's socially and economically justified need for water;
- limiting the scope of negative flood and drought effects and preventing increasing the risk of emergency occurrence as well as limiting their negative results.

It is assumed that adopting *National Strategy for Water Management 2030* that defines basic objectives for the suggested reform would provide conditions required for the sustainable development of water resources management in Poland, thus ensuring survival of a significant number of water ecosystems and water-dependent ecosystems.

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All the presented activities related to eliminating or limiting biological diversity threats contribute to discharging the obligations stipulated in Article 8 of the Convention on Biological Diversity and attaining the objectives specified in the Convention's Strategic Plan, The 2010 Target and Millennium Development Goals. However, efficiency of the activities depends on a number of problems, difficulties and limitations, in particular:

- high degradation of natural environment in areas previously and / or currently subject to strong anthropogenic pressure;
- insufficient knowledge of the impact of selected civilisational factors and changes on biological diversity;
- insufficiently effective execution of law.

### **3.3 Preservation and/or improvement of existing as well as restoration of lost components of biodiversity**

Achieving high effectiveness in actions aimed at the preservation or improvement of the biodiversity to a large extent depends on the effectiveness of the usage of the diverse instruments which are complementary one to another and react flexibly to the changeable national and international realisation conditions. The most important of them are among others: a system of

protected objects and areas meeting the needs, effective species conservation plus forces and means that enable an improvement or restoration of natural resources.

***In situ* protection of plants and animals**

According to the Act on Nature Conservation passed by the Polish Parliament on 16 April 2004, in Poland there are present the following forms of the nature conservation:

- national parks
- nature reserves
- landscape parks
- protected landscape areas
- Natura 2000 sites
- natural monuments
- documentary sites
- ecological sites
- nature-landscape protected complexes
- plant, animal and fungi species protection.

A National Park is defined in the Act on Nature Conservation as a protected area covering not less than 1000 hectares, which is distinguished by special scientific, natural, social, cultural and educational values. Nowadays in Poland there are 23 national parks of the total area of over 317 000 hectares, which makes about 1% of the area of Poland. The Bialowieski National Park and the Pieninski National Park established in 1932 were the first Polish national parks. The last one was the Ujście Warty National Park established in 2003. The areas of a strict protection in the parks cover over 67 000 hectares, whereas the remaining area is covered with an active or landscape protection.

A nature reserve, as specified in the act, is an area covering, in the natural or not much changed state, ecosystems, namely, natural sites as well as plant, animal and fungi sites; animate and inanimate nature components with particular natural, scientific and cultural values or natural qualities. As of year 2007, in Poland there were established 1 423 reserves of the area of almost 169 000 hectares, which makes about 0,5% of the area of Poland. Areas of strict protection in the reserves cover over 3 000 hectares, and the remaining part is covered with an active or landscape protection.

On 30 March 2005, the Minister of Environment issued the Regulation on Kinds, Types and Subtypes of Nature Reserves. It distinguished the following kinds of nature reserves: forest, water, grassland, halophyte, wildlife, floristic, peat, unanimated nature as well as landscape ones. The document also defined their types and subtypes with regard to the dominating subject of conservation and the type of an ecosystem. From the total number of the reserves the most numerous are the forest (714) and the least numerous are the halophyte ones (4).



*Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

A landscape park in the Act on Nature Conservation is defined as the area protected because of its natural, historical and cultural values as well as its landscape qualities in order to preserve and promote these values in the conditions of the sustainable development. At present in Poland there are 120 landscape parks with the total area of 2 600 000 hectares which makes 8% of the country territory.

The remaining forms of the natural protection established in Poland include: protected landscape areas – 412 with the area of nearly 6 700 000 hectares, which makes 22,1% of the area of Poland; natural monuments – 35 074; ecological sites – 6 686; documentation sites – 153; and nature-landscape protected complexes – 207. Altogether 32,1% of the area of Poland is covered with various forms of the nature preservation.

Since 2001 the number of the national parks and the landscape parks has not changed. However, the changes in the number of the nature reserves, protected landscape areas, natural monuments, documentation sites, ecological sites and landscape-nature protected complexes, which took place during a few last years, can be presented in the following way:

Nature conservation form	2000		2006		2007	
	number	area (hectares)	number	area (hectares)	number	area (hectares)
Nature reserves	1 307	148 731	1 407	166,901	1 423	168 797
Protected landscape areas	407	7 137 666	411	6, 993 396	412	7 047 537
Natural monuments	33 094	-	34 549	-	35 074	-
Documentation sites	103	956	142	762	153	780
Ecological sites	6 113	44 948	6 645	45,180	6 686	46 135
Nature-landscape protected complexes	170	78 108	200	90,616	207	93 510

Source: Central Statistical Office

Some areas obtained the status of the international importance because of their unique European or world qualities. These include:

- the Białowiecki National Park is on the World Heritage List;
- the Babiogórski National Park, the Białowiecki National Park, the Bieszczadzki National Park, the Kampinoski National Park, the Karkonoski National Park, the Poleski National Park, the Słowiński National Park, the Tatrzański Park Narodowy and the Łukajno Lake nature reserve have been recognised as the World Biosphere Reserves;

*Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

- the reserves: Łukajno Lake, Karaś Lake, Świdwie Lake, Milicz Ponds, Družno Lake, Seven Island Lake as well as the Biebrzański National Park, the Słowiński National Park, the Ujście Warty National Park, the Wigierski National Park, the Poleski National Park, the Narwiański National Park, plus the subalpine Peatbogs in the Karkonoski National Park have been listed in the index of the Ramsar Convention;
- four areas: Polish-Belarusian – Białowieża Forest, Polish-Slovakian-Ukrainian - the Eastern Carpathians, Polish-Slovakian – the Tatra Mountains and Polish-Czech – the Karkonosze Mountains have obtained the status of the Transboundary Biosphere Reserves.

Because of the need of adapting the national law to the European Union Council Directive on the Conservation of Wild Birds (the Birds Directive) and the Council Directive on the Conservation of Natural Habitats of Wild Fauna and Flora (the Habitats Directive) a new form of the conservation was implemented into the Act on Nature Conservation on 16 April 2004 – Natura 2000 sites. In the same year Poland performed its duty and delivered to the European Commission the Regulation of the Minister of the Environment naming 72 special protection areas for birds comprising 3,7% of the country area. In total, Poland suggested 256 Natura 2000 sites with the area 2 900 000 hectares which made 9,3% of the land area of Poland. They were chosen according to the scientific data from 1990-2002, and corrected by experts from purposely established province implementation teams.

In 2006, taking into consideration the suggestions of the bio geographical seminary of the alpine region, there were conducted supplementary researches aimed at marking additional sites and completed the Natura network in this region. As a result, the Polish government sent to the European Commission the proposals including 9 new special areas of habitat conservation in the alpine region covering the area of 160 000 hectares.

In the same year the extensive inventory works began in all regions of Poland. They were aimed at providing more specific and current data which would enable to complete the Natura 2000 network with new Natura 2000 sites. In 2006 and 2007 among the others the following actions were taken within the framework of the above activities:

- there was conducted an inventory of natural habitats in 44 prospectively chosen Natura 2000 special areas of conservation in the Lower Silesian Voivodeship. On the basis of the data obtained from the professional literature and partly on the basis of the regional stocktaking there was also conducted an analysis of the presence of fauna and flora species and the natural habitats listed in the annexes to the Birds Directive and the Habitats Directive in the strips of field 550 m wide from the axis of the three designed motorways;
- 79 special protection areas for birds reported to the European Commission, 32 prospective special protection areas, 126 special areas of conservation of natural habitats reported to the European Commission plus 116 prospective special areas of conservation have been included in the inventory.

Independently of the above inventory actions, the State Forests National Forest Holding conducted a widespread inventory of the natural resources in the State Forests. It included: 50 animal species, 45 types of natural habitats plus 32 plant species present in the annexes to the

*Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

Habitats Directive as well as 6 bird species present in the annexes to the Birds Directive (the black stork, the white-tailed eagle, the lesser spotted eagle, the crane and the black grouse). The data obtained from the inventory conducted by the National Forest Holding and from other projects as well as research and monitoring programmes (therein the activities of the Province Expert Teams) make the essential basis for the further completion of the Natura 2000 sites network in Poland.

Altogether the Polish government reported to the European Commission:

- 141 bird special protection areas covering 15,97% of the country area,
- 364 proposed special areas of habitat conservation covering 8,37% of the country area.

In order to adapt the national law to the Birds Directive and the Habitats Directive and to comply to the act of 16 April 2004, the following regulations referring to the species protection were issued:

- Regulation of the Minister of Environment on the Protected Wild Plant Species of 9 July 2004;
- Regulation of the Minister of Environment on the Protected Wild Fungi Species of 9 July 2004;
- Regulation of the Minister of Environment on the Protected Wild Animal Species of 28 September 2004.

In previous acts the fungi kingdom had been included into the regulations referring to the plant protection. The regulations presented only lists of animal and fungi species under the strict and partial protection. They protected the same plant and fungi species not taking their habitats, mainstays and stands into consideration. Past prohibitions related to the protected plants and fungi did not refer to all species named on the lists and did not note any diversification. At present separate regulations for the plant species and the fungi species under protection are in force. These acts also define the species under partial protection that can be gained for economic purposes as well as methods of this gaining, plus species requiring the establishing the protection zones for their stands or mainstays, prohibitions for certain species or groups of species, as well as exceptions of those prohibitions and methods of species protection, including the size of protection zones.

The previous regulations referring to the animal species protection presented only lists of wild animals under a strict or partial protection. It had not enumerated the species requiring an active protection gained for economic purposes, nor the bird species that can be brought in Poland if they were gained legally. The document also did not specify the methods of protection of individual species. The present regulation regulates the above questions. Moreover, it defines the methods for protection of habitats, mainstays and stands of individual animal species or their groups. It also establishes protection zones, their size and close seasons. The regulation also defines the prohibitions referring to protected animal species as well as exceptions of those prohibitions. The prohibitions and exceptions refer to individual species or groups of species.

*Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

As far as plant species are concerned, strict protection covers 387 species, 28 complete genera, 2 genera with the exception of 2 species and 1 complete family. They belong to the following taxonomic and ecological groups:

- algae – 23 species;
- moss – 134 species, 5 complete genera and 1 genus with the exception of 2 species, and 1 genus with the exception of species;
- polystichum – 19 species and 3 genera, and 1 family;
- spermatophytes – 211 species, 20 complete genera, 1 genus with the exception of 2 species and 1 genus with the exception of 1 species.

The partial protection covers 49 species and 2 genera:

- algae - 4 species;
- moose - 27 species and 1 genus;
- spermatophytes - 18 species and 1 genus.

Among the partly protected species, 14 were distinguished which can be collected for economic purposes. At the same time the methods of gaining were defined. Moreover, there were indicated 10 plant species that require the creation of protection zones and their size was defined.

Strict protection of fungi and lichens refers to:

- fungi – 45 species and 7 genera;
- lichens - 33 species, 19 genera and 3 genera with the exception of 1 species.

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Partial protection covered 1 fungus species and 9 lichen species. Among the partly protected species there were distinguished 1 fungus species and 1 lichen species, which can be collected for economic purposes. There were indicated 4 lichen species that require establishment of protection zones and their size was defined.

Regarding animal protection, strict protection covered 228 species, 2 complete genera, 1 genus with the exception of 2 species, 17 complete families, 6 families with the exception of 1-8 species, 1 complete order (the cetaceans), 1 order with the exception of 4 species (the passerines) plus 2 complete phyla (amphibians and reptiles) , among others:

- invertebrates – 157 species, 2 genera, 1 genus with the exception of 2 species and 1 family;
- fish – 19 species and 2 families;
- birds – 23 species, 11 complete families and 6 families with the exception of 14 species and 1 genus with the exception of 4 species;
- mammals – 29 species, 3 families and 1 genus.

*Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

Among the strictly protected animal species there were distinguished 157 species, 2 families and 1 phylum (amphibians) that require an active protection. The partly protection covered 23 species:

- invertebrates – 7 species;
- birds – 9 species;
- mammals – 7 species.

Among the partly protected species there were distinguished 5 species that can be collected for economic purposes. According to the Birds Directive, there were also named bird species that can be sold, transported and held for economic purposes providing they are legally hunted (4 species). Moreover, there were distinguished 25 species and 1 order (the bats) which require the creation of a full year's and seasonal protection zones. The size of the zones was also defined.

- invertebrates – 1 species;
- reptiles – 3 species;
- birds - 18 species;
- mammals – 3 species and 1 order.

At present a project of changing regulations on the protected wild animals, referring to the opinion of the European Commission pointing the maladjustment of some parts of this document to the Birds Directive and Habitats Directive, is in the final phase of preparation. It refers among others to the great black cormorant, the grey heron and the otter which are partly protected with the exception of fish-breeding ponds perceived as farming areas. The European Commission stated that an unconditional deviation from the prohibitions referring to the partly protected species was contradictory to the above directive, according to which issuing a permission for the deviations relating to protected species is possible only under specifically defined conditions.

In the case of livestock, the basic method of protecting their genetic resources is *in situ* protection on farms in traditional breeding regions keeping typical systems of maintenance. The programme of the protection of livestock genetic resources that since 2002 has been coordinated by the National Research Institute of Animal Production, develops very dynamically. For instance, in 1999 only one cattle breed (Polish red) was covered with the protection programme. In 2002 a restitution of the white-back cattle began. And in 2007 the programme covered also the population of the Polish black-and-white and red-and-white cattle. The implementation of the new breeds into the protection programme was determined either by the necessity for the protection of a breed threatened with extinction (eg. traditional two-direction milk-meat type cattle, the Malopolski, Silesian and Wielkopolski horses), or the need for and interest in the restitution of a native breed (eg. the Sztum and the Sokolskie horses, the old type merinos, the mountain sheep - zackels).

Till 2004 the protection of the livestock genetic resources has been supported exclusively by the Ministry of Agriculture and Rural Development. In 2005 these actions were covered with the agro-environmental schemes. First, it referred to cattle, horses and sheep breeds, and since 2007 it has been covering also pigs breeds which resulted in an increased possibility for the protection

of the genetic resources of these species. In years 2007-2013 a huge increase in the number of females of the protected native breeds is planned. It ought to create firm basis for the development of these populations and ensure the maintenance of the genetic diversity within the breeds. The *in-situ* protection of breeds, lines and strains within the species of fur-bearing animals, poultry, bees and fish is financed only by the national budget.

Conservation of crops and related species uses mainly the methods of *ex situ* protection in gene-banks. However, the Convention on Biological Diversity, and the FAO Global Plan of Action for Animal Genetic Resources pay special attention to *in situ* protection as the one proper for the protection of genetic resources. It is important to support farming and use forgotten crops or the ones of marginal importance. Many of them stand a chance of becoming more widely used, particularly in the regions where the breeding of the basic species is either unprofitable or impossible. So far such types of actions in Poland have been rarely taken, and mainly by non-governmental organizations.

In 1994-2008 the Global Environment Facility Small Grant Programme SGP/GEF refinanced about 200 projects supporting the objectives of the Convention on Biological Diversity. Sixteen of them are directly aimed at the *in situ* protection of the genetic resources of plants and animals. The projects implemented among others by The Friends of Lower Vistula Society (Towarzystwo Przyjaciół Dolnej Wisły), the Lower Silesian Foundation for Sustainable Development (Dolnośląska Fundacja Ekorozwoju), the Solidarni "Plus" Association (Stowarzyszenie Solidarni Plus), the Naturalists' Club (Klub Przyrodników), the Social Ecological Institute (Społeczny Instytut Ekologiczny), Stowarzyszenie Konfederacja Służby Zielonych Płuc Polski, and Stowarzyszenie Miłośników Suwalskiego Parku Krajobrazowego "Kraina Hańczy" referred to the preservation of old plant species, eg. old orchards and native stock breeds. The Rural Development Foundation (Fundacja Wspomagania Wsi) supported "minigrants" aimed at preventing poverty owing to preserving a biological diversity of plants and animals used by human beings.

### ***Ex situ* protection of plants and animals**

The following institutions take part in the *ex situ* protection of the biodiversity of crop plants: Gene Pathogen Bank, Kostrzyca Forest Gene Bank in Kostrzyca (LBG), as well as botanical gardens, arboreta and medicinal plant gardens. Whereas the *ex situ* protection of the wild fauna is provided by zoological gardens, public aquariums, animal breeding centres and private collections.

Botanical gardens are places cultivating collections of herbaceous plants, trees and shrubs. In Poland there are 11 institutions of this type. All of them have a formal connection or cooperate with scientific institutions such as universities, the Polish Academy of Sciences and agricultural high schools which enable the use of their research background as well as conducting their own researches. In 17 Polish arboreta there are collections of trees, shrubs and undershrubs. These places play a similar role to botanical gardens, however the scientific research refer mainly to the taxonomy, the acclimatization of foreign species and its practical use in the forest culture. Medicinal plants gardens are subordinated to first of all to medical academies. They collect plants used in health care. The main stress is put on the research referring to the production of new medicines. In Poland there are 7 institutions of this type.

In 1979, on the basis of an inter-resort agreement in the Plant Breeding and Acclimatization Institute, there was established the National Centre for Plant Genetic Resources plus the network of leading collections located in various scientific centres. By the end of 2007 the collections of individual species were financed from the resources of the biological development of the Ministry of Agriculture and Rural Development on the basis of the annual regulation. Currently the collections of genetic resources are financed within the framework of two long term programmes implemented for farming plants by the Plant Breeding and Acclimatization Institute and garden plants by the Research Institute of Pomology and Floriculture as well as the Research Institute of Vegetable Crops.

The Programme of Protection of Plant Genetic Resources( [http://www.ihar.edu.pl/gene\\_bank](http://www.ihar.edu.pl/gene_bank)) includes the genetic material of the most important crop plants and related species for the needs of farming and researches. It is put into practice by the network of cooperating collections. They are placed at high schools, trade institutions and at the Botanical Garden – Centre for Biological Diversity Conservation of the Polish Academy of Sciences. They are connected with the central repository and the system of information on genetic resources at the National Centre for Plant Genetic Resources IHAR. The institute is an essential consultant of the programme. The Advisory Council for the Protection of Plant Genetic Resources founded at the National Centre for Plant Genetic Resources is a body assessing the actions of the Centre as well as the cooperating collections. The mentioned institutions create the Polish gene bank. Its tasks include:

- collecting the genotypes of plants under threat of a genetic erosion,
- assessment of the collected genotypes,
- long term storing the collected materials in the living state and making them available to farmers, scientists and others,
- evidencing the collections and dissemination of the data.

At the IHAR National Centre for Plant Genetic Resources there are appliances for the long term storage of plant samples. The long term storage serves all collections of crop plants genetic resources. Collections of fruit-growing plants, hops, potatoes and garlic are stored vegetatively in a form of plantation. Potato varieties are stored *in vitro*. The new technologies of the long term storage of genetic resources are developed, eg. cryostorage of the tissues of plant species reproduced vegetatively.

National collections of crop plants are forced to protect first of all Polish genetic resources (wild species, ecotypes, local varieties and national farming forms, registered varieties and varieties removed from the register as well as valuable genetic material developed at research stations). In Poland various forms of protection cover 73 000 genotypes of crop plants (45% come from Poland). Over 65 000 of them are plant samples deposited at the long term repository of the IHAR National Centre for Plant Genetic Resources. A few thousands objects are stored in a vegetative form (fruit trees, shrubs, hops, potatoes, garlic, asparagus, etc.). Most of the stored genotypes are national and foreign varieties and farming lines. The remaining materials are placed in the research and working collections of institutes and breeding centres as well as educational collections of high schools.

*Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

Since 2006 all passport data of the collected objects have been available in the EURISCO catalogue and in the Global Biodiversity Information Facility system. Annually from 1 000 to 10 000 genotypes are provided; 50-70% are ordered by scientific centres, 5-20% by farmers, and 5-10% by other gene banks.

Since 1995 in the Institute of Plant Protection in Poznań there have been operating the Gene Pathogen Bank. Its task is to preserve and make accessible the pathogens of crop plants. Under protection there are also collections of symbiotic bacteria of leguminous plants.

The seeds of protected and endangered plants are stored in liquid nitrogen in the Botanical Garden – Centre for Biological Diversity Conservation of the Polish Academy of Sciences.

Actions aimed at the preservation of the forest genetic diversity *ex situ* are taken systematically on the basis of the network of various centres, such as:

- 16 seed husking plants;
- 25 seed vaults (regional gene banks);
- 8 seed testing stations;
- 5 seed quality control services.

A special place in the strategy of the forest genetic diversity protection *in situ* is taken by the Kostrzyca Forest Gene Bank in Kostrzyca. It stores genotypes of disappearing and endangered populations of tree and shrub species, mainly from the region of tree dying disaster in the Sudetes, in the form of tissue cultures and generative organs. There are also stored the genotypes of the oldest trees in Poland (over 200-250 years old, depending on species) as well as endangered plants coming from the undergrowth.

Within the Kostrzyca Forest Gene Bank there is also an arboretum and a nursery producing seedlings of the trees of local origin stored in the gene bank which are aimed at the restitution of the species destroyed during the ecological disaster in the Sudetes. The institution also coordinates “The Programme of the Preservation and Restitution of the Common Yew in Poland”.

An important role in the protection of forest biological diversity is played by the archives of the clones of forest trees located in the Syców forest inspectorate (for south-west Poland) and in Łomża forest inspectorate (for north-east Poland). They collect the genotypes of valuable forest trees and natural monument trees. A similar role is played by forest arboreta in Wirty (the Kaliska forest inspectorate), Glinna (the Gryfino forest inspectorate), Kudypy (the Kudypy forest inspectorate, Syców (the Syców forest inspectorate).

The *ex situ* protection of the wild fauna in Poland is provided by zoological gardens, public aquariums, animal breeding centres and private collections. In Poland there are 14 officially registered zoological gardens. Nine of them belong to the European Association of Zoos and Aquaria (EAZA). All Polish zoos take part in the European Endangered Species Programme (EEP) and collect data for pedigree books of endangered species. They also participate in the International Species Information System (ISIS).



*Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

Currently in Polish Zoological Gardens over 100 species are covered with breeding programmes. Seventy percent of these species are concerned as endangered, therein 4 species present in Poland (the European bison, the European mink, the otter and the white-tailed eagle). A pedigree book is kept for over 50 species, including 2 native species: the brown bear and the black stork.

In spite of the fact that the *in situ* protection is a basic one in relation to farming animals, the *ex situ* protection plays an important supplementary role. On the basis of the regulation of the Minister of Agriculture and Rural Development of 24 June 2008 the National Research Institute of Animal Production was chosen as the only entity for collecting and storing the biological material of individual species of farming animals under cryoconservation. However, so far the National Gene Bank of Animal Genetic Resources has not been founded. Such an institution would collect in a complex and coordinated way the genetic material of the farming animals like in other European countries.

In the National Research Institute of Animal Production, within the framework of the earlier introduced programmes of the protection of farming animals genetic resources, there have been collected over 40 000 doses of semen and about 2 000 embryos of the Polish red cattle and about 1 500 doses of semen plus a few dozens embryos of the świniarka sheep and the wrzosówka sheep.

Moreover, at the Institute of the Molecular Andrology of the Institute of Animal Breeding and Food Research of the Polish Academy of Sciences in Olsztyn there have been collected about 40 000 doses of semen of the rainbow trout, and at the Institute of Ichthyobiology and Aquaculture of the Polish Academy of Sciences in Golysz there are stored over 10 000 doses of semen of the European carp. An effective introduction of the programmes and projects related to the *ex situ* protection of plant and animal genetic resources is impeded by a number of problems. Special attention should be paid to:

- the fact that Poland does not have a general complex plan of the implementation of *ex situ* protection which is crucial in reference to the genetic resources used in agriculture. Individual institutions create their own collections and collect their own data referring to the question of endangered, rare and disappearing species which impedes the flow of information and the coordination of research;
- a lack of financial stability ensuring the effective implementation of the protection activities seems to be a serious problem. It influences negatively the possibility of conducting the long term research, stocktaking or collecting genetic resources in the field as well as the valorisation of the present collections;
- the progressive genetic erosion of crop plants is a serious obstacle impeding the realization of the programme;
- the fact that lack of qualified scientific staff is a big obstacle. Only for a few last years students in some institutions – eg. Warsaw University of Life Sciences (SGGW) – have had a possibility of gaining deeper and systematized knowledge on *ex situ* protection of genetic resources.

In spite of the numerous obstacles the established organizational and legal bases enable, though on a limited scale, the introduction of programmes and projects aimed at the *ex situ* protection of the genetic resources. However, there are still a lot of urgent problems to be solved, such as ensuring an effective financing system of the *ex situ* protection of the genetic resources, the improved coordination of research in this field and the information flow. A crucial task is also to inform the society about the importance of the taken actions thanks to educational programmes or disseminating proper information in the media.

### **Restitution and reintroduction programmes**

A part of particularly endangered plant and animal species in Poland has been covered with restitution and reintroduction programmes. Currently more than ten such programmes are being put into practice. The ones of a huge significance for preserving the biological diversity include:

- the restitution of the peregrine falcon in the Pieniny, the European bison in the Carpathian Mountains, the zarte, the Atlantic sturgeon, and the sea trout in the north of Poland and in the Upper Vistula river basin, the water chestnut in the Oswiecimska Valley, the European silver fir in the Sudetes as well as the protection and restitution of the European yew in Poland
- the reintroductions of the Eurasian lynx in the Kampinos Forest, the European ground squirrel in Opole Province, the edible dormouse in the woods of western Poland, the European tree frog in Suwalki Region, the Eurasian eagle owl in the Wolin National Park, the great bustard in the Greater Poland, the European pond terrapin in Polesie as well as the black grouse and the wood grouse in the Vistula forest inspectorate;
- the reintroduction of epilithic plant species including the snow saxifrage, the cardamine *resedifolia*, and the alpine woodsia in southern Poland, the marsh *gladiolus*, the four leaf clover, the *Caldesia parnassifolia*, the *Luronium natans*, the bog bulrush in western Poland and the waterwheel plant.

The following research centres and high schools are responsible for the implementation of restitution and reintroduction programmes: the Polish Academy of Sciences Institute of Nature Conservation, the Polish Academy of Sciences Institute of Dendrobiology, the Inland Fisheries Institute, the Warsaw University, the Adam Mickiewicz University in Poznań, the Warsaw University of Life Sciences as well as the universities of agriculture in Poznań and Lublin. Moreover, ecological organizations also play an important role, first of all the Polish Society for Nature Conservation 'Salamandra' (Polskie Towarzystwo Ochrony Przyrody Salamandra), the Wild Animal Protection Society 'Sokół' (Stowarzyszenie Na Rzecz Dzikich Zwierząt „Sokół”), and WWF-Poland, as well as national parks, and particularly the Kampinos National Park and the Polesie National Park. The State Forests on their area have been taking care of the restitution and reintroduction for many years.

Moreover, as it has been already mentioned, there were taken effective actions aimed at the restitution of five breeds: the white-backed cattle, the Sztum and the Sokolskie horses, the old type merinos, the mountain sheep – zackels. At the National Research Institute of Animal

Production there have been taken actions for the benefit of the restitution of the native Carpathian goat, which will be continued.

As far as plants are concerned, the National Centre of Plant Genetic Resources of the Plant Breeding and Acclimatization Institute has initiated the project 'Niecka Nidziańska – the model mainstay of agrobiodiversity' supported financially by the EcoFund Foundation. The main aim of the project is to reproduce characteristic population of dying weeds.

Within the framework of the *Rural Development Programme 2007-2013*, Package 6 'Preservation of endangered plant genetic resources in agriculture', the aim of the variant '6.3 Seed production commissioned by gene banks' is to reintroduce farming of the local plant populations and to encourage farmers to take part in the selection process. Local populations collected in gene banks will be used for the implementation of the variant.

## **GMO**

The necessity of the protection of the natural environment and human health was the crucial problem resulting in creating and implementing legal standards and organizational solutions which must minimize the possible negative influence of the movement, transit, transfer and use of genetically modified organisms on preserving and sustainable use of biological diversity.

The basic legal regulation on genetically modified organisms is the Act of 22 June 2001 on Genetically Modified Organisms. It includes among others regulations referring to:

- contained use of genetically modified organisms (GMO);
- deliberate release of GMO into the environment for purposes other than placing on the market;
- placing GMO on the market;
- export and transit of GMO products;
- the competence of the government administration bodies on GMO.

According to the Act of 22 June 2001 on Genetically Modified Organisms, the Minister of the Environment as the Polish Competent Authority competent on GMO issues, among others:

- granting consents for the contained use of GMO;
- granting consents for the deliberate release of GMO into the environment;
- granting consents for the GMO marketing;
- granting consents for the export and transit of GMO products;
- coordinates the supervision and monitors the activities regulated by the act;
- coordinates the collecting and exchange of information referring to human health and environment safety with regard to GMO.

Tasks resulting from the act on genetically modified organisms are performed in the Ministry of the Environment by the purposely appointed GMO division. Moreover, there was appointed the GMO Commission as the consulting body of the Minister of the Environment. Its members are

the representatives of the government administration, scientific bodies, biotechnology industry, non-governmental ecological organisations and consumer organisations. The tasks of the commission include giving opinions on the question of giving permission or consent for the contained use of GMO, deliberate release of GMO into the environment, placing GMO on the market plus export and transit of GMO products. Moreover, the Commission gives opinions on all questions presented by the Minister of the Environment in reference to his obligations resulting from the act on GMO, as well as opinions on legislation within GMO and biological safety, and opinions on the Polish policy in this field.

Irrespective of the supervisory functions the Minister of the Environment, the following bodies make control on genetically modified organisms according to their competences on the basis of the act on GMO: the State Sanitary Inspection, the Main Inspectorate of Plant Health and Seed Inspection, the Inspection for Environmental Protection, the Veterinary Inspection, the Trade Inspection, the National Labour Inspectorate, and the customs within the framework of the supervision of the legal trade of GMO, as well as the Agricultural and Food Quality Inspection. The Minister of the Environment is able to apply to these inspections, according to their competence, for supervising all activities obeying the act. Simultaneously, inspection bodies exercising inspection ex officio are obliged to inform the Minister of the Environment about risk and undertaken actions related to GMO immediately.

Because of the fact that the Act on Genetically Modified Organisms of 2001 does not fully transpose and implement the European Union regulations as well as the ones resulting from international agreements to the Polish legislation and the fact that the act includes numerous loopholes as a result of fast change of social and economic situation in the country, there appeared a necessity for a thorough reconstruction of the legal system in this field. Consequently, in 2005 the Ministry of the Environment began work on new legislation – the Law on Genetically Modified Organisms. The prepared project regulates the whole of GMO related issues, defining the rules and conditions for: GMO facilities, the contained use of genetically modified micro organisms as well as the contained use of genetically modified organisms, the deliberate release GMO into the environment for an experimental purposes, the placing genetically modified organisms as products or in products on the market, the coexistence of the farming of genetically modified crop plants with the farming of conventional crop plants, and making the information on genetically modified organisms available for the public. The project also ensures a full transposition of the EU legislation on genetically modified organisms and specifies the regulations which seemed questionable and difficult to interpretation during the time when the act was in force. The project also introduces specific changes in the competency regulations of control bodies, specifying the range of activities of inspections within the framework of the supervision imposed tasks by the act on genetically modified organisms.

### **Alien Species**

For many years alien species have been perceived as a serious threat to the native biological diversity. It is estimated that over 30% of all fish and over 10% of all mammals in Poland are alien species that were introduced intentionally or accidentally. The question of alien species invasion refers mainly to native flora. According to the latest data, the flora of Poland includes about 2 935 settled species, 445 of these are foreign origin species, and 290 of the latter are

classified as kenophytes (plants coming to Poland after the year 1500). Over a half of them is entering the area of natural and semi-natural communities, and over a quarter is enlarging its range dramatically.

Such threats are reflected in the present Polish legal regulations which are successively verified and completed. In a few last years there have been passed and amended numerous legal acts regulating intended introductions of foreign species, including the Act on Nature Conservation, the Act on Inland Fisheries and the Act on Sea Fishery. According to the regulations from the acts, the alien species introduction to the natural environment requires the consent of the minister of the environment or the minister of agriculture. The consent of the minister of the environment is also necessary for importing alien species to Poland, which in the case of release can endanger native species. Legal acts regulating controlling the number of foreign species already introduced to Poland were amended as well.

The numerical force of game species is supervised according to the regulation of the Minister of the Environment on Establishing the List of Game Species and Hunting Seasons. However, two alien crayfish species and three alien fish species are under the numerical force supervision according to the regulation of the Minister of Agriculture and Rural Development on Fishing and Propagating, Rearing and Harvesting of Other Aquatic Organisms. In spite of this, in Polish legislation regulating the questions concerning alien species there were present numerous loopholes and inconsistencies. A significant part of them was removed by the 3 October 2008 Act Amending the Act on Nature Conservation and Some Other Acts, which came into force on 15 November 2008. Among others, the definition of alien species was introduced, according to which an alien species is a species present beyond its natural range in the form of specimen or able to survive gametes, spores, seeds, eggs or a part of specimen thanks to which they can reproduce. The act obliges the Minister of the Environment in cooperation with the Minister of Agriculture and Rural Development to define with a regulation the list of alien species of plants, animals and fungi which could endanger native species or natural habitats in the case of their release into the natural environment. The project of such a list has been prepared by the Polish Academy of Sciences Institute of Nature Conservation. There has been also conducted the modification of deviations from not using the regulations referring to alien species in the scope of afforestation and rational agricultural and forest economy consisting in the exclusion of alien species which, in the case of release into the natural environment, could endanger native species or natural habitats.

Research carried out for many years in various research centres has helped define the character of threats to native ecosystems caused by the occurrence of non-native species. However, the system which is to make it possible to follow their reintroduction and spreading does not fully operate. The information on species is scattered, therefore it is difficult to obtain the whole picture of threats. Since 1999 the Polish Academy of Sciences Institute for the Nature Conservation has been developing the data base *The Alien Species in Poland*. In 2003 it was translated into English and made accessible on the Internet (<http://www.iop.krakow.pl/ias>). In 2004-2008 there was introduced the project of the State Committee on Scientific Research entitled *Invasive alien species in Poland and conservation of biological diversity* coordinated by the Polish Academy of Sciences Institute for Nature Conservation and Institute of Botany in Cracow aimed

#### *Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

at preparing a possibly detailed estimation of the threats of alien species to the native diversity. Thanks to the financial help from the National Fund for Environmental Protection and Water Management, the results of the project have been made accessible on the Internet (<http://www.iop.krakow.pl/gatunkiobce>) and are being spread on CD-ROMs. A two-volume publication on this subject is planned for the year 2009.

There have been also worked out the rules of procedure on alien species in native fauna and flora. Within the framework of the activities:

- there was made the list of alien species which enlarge its range on the territory of Poland;
- there was defined a spatial scale and the expansion pace of alien species as well as the pace of changes in their population number;
- there was made a list of foreign species posing a threat to native fauna and flora plus the evaluation of kinds and scale of threats to native biological diversity;
- there were proposed the methods of limiting the effects of a negative counteraction aimed at the threats posed by invasive alien species in Poland, therein:
  - the methods of controlling the number of alien species with a negative influence on native fauna and flora;
  - the possibilities of economic use of alien species.
- there was prepared a list of foreign species that had not been found in Poland, which due to an expansion to Europe, will probably soon appear on the territory of Poland and their potential threats to native biological diversity as well as the possibilities of limiting these threats.

Irrespectively of the above actions, in 2008 the Polish Academy of Sciences Institute for Nature Conservation prepared an expertise ordered by the Minister of the Environment entitled *Development of a list of plants, animals and fungi of alien species which in the case of a release into the natural environment may endanger native species or natural habitats*. Its results will be used for drafting legal regulations.

#### **CITES**

The conservation rules concerning wild populations of plant and animal species endangered with extinction are regulated on a global scale by the regulations of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) through supervision and limiting international trade. On the national level the above question is raised by the Act on Nature Conservation 16 April 2004. Effectiveness of taking the preventing actions depends not only on the efficient engagement of the nature conservation services, but also such institutions as the Police and Customs.

In Poland the CITES Working Group operates, whose members represent the following bodies: the Ministry of the Environment, the State Council for Nature Conservation, the Ministry of Finance, the Customs, the Police, the Veterinary Inspection, non-governmental organisations, as well as the representatives of zoological gardens and the Public Prosecutor's Office. Actions are being taken aimed at creating a working group consisting only of the representatives of the public

*Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

administration of governmental level, to ensure better cooperation between particular institutions at implementing and enforcing the provisions of the Convention.

At the Polish Police Headquarters there is a group designated for investigating crimes against the environment, including endangered plant and animal species covered by CITES. The group coordinates and monitors the actions of the Police local units supervising the internal market, including shops and zoological markets as well as sale of CITES species via the Internet. According to the data of the Polish Police Headquarters in 2006 an increase in the detection of crimes referring to the trade in wild fauna and flora in comparison with the previous year was noted. In 2005 – 114 cases of law violations were reported, whereas in 2006 – 231 ones. According to the Customs, in 2005 there were 1105 seizures of living animals, 1100 plants, 30 litres of extract from African Plum-tree bark, 6900 porcupine spines, 160 kg of sturgeon caviar plus 4230 specimens of Traditional Asian Medicine. In 2006 there were 2015 seizures of living animals, 1100 living cacti, 180 kg of caviar as well as 2662 specimens of Traditional Asian Medicine.

Within the framework of informative actions the Ministry of the Environment keeps an Internet website devoted to the above problems. It includes among others a current list of the species covered by CITES plus the information on the UE regulations concerning wild fauna and flora trade. Moreover, on the websites of the particular Customs Chambers and Police Headquarters there is published information on seizures and confiscations.

In 2005-2006 a widespread training action for the representatives of the bodies involved in the fight against crime aimed at endangered plant and animal species took place. Within this framework the following actions were provided:

- a training for the CITES coordinators from the Customs referring to the identification of inspect species under protection as well as taking samples and preserving genetic material;
- 3 central trainings for the CITES coordinators from the Police;
- 102 local trainings for the Customs involving over 2250 Customs officers;
- 2 training workshops for the CITES coordinators from the Customs and Provincial Police Headquarters;
- 3 training workshops devoted to the enforcement of the CITES regulations for prosecutors, judges and the representatives of the Veterinary Inspection.

In order to raise the social awareness of the wild fauna and flora trade numerous campaigns and informative actions took place with an active engagement of non-governmental organisations. Among others with the active participation of WWF Poland at three international airports in Gdańsk, Poznań and Wrocław there were organized exhibitions presenting CITES specimens. In Wrocław, the Polish Society for Nature Conservation ‘Salamandra’ conducted educational campaigns, e.g.:

- “Don’t buy endangered species” – related to the limitations of buying and transporting souvenirs made of the CITES plant and animal species;

- “Help to protect endangered species” – aimed at spreading knowledge and awareness of CITES among the youth at schools.

Several times a year the representatives of Poland take part in the work of the Committee on Trade in Wild Fauna and Flora, which comprises of the representatives of the European Union Member States. During the meetings questions are discussed referring to the particular CITES species and the ways of preventing their illegal introduction into the market as well as transborder transporting.

The representatives of Poland also take part in the CITES Conference of the Parties. The last one (COP 14) was held on 3-15 June in the Hague. The Conference accepted changes in the appendices to the Convention, the CITES strategic plan for 2008-2013, as well as numerous resolutions and decisions concerning among others the improvements in the operating and enforcement of the Convention’s regulations and the Internet trade in CITES specimens.

### **Sea and coastal area protection**

The results of the research of the Polish zone of the Baltic Sea show a persisting and in places high degradation of the sea environment. The worst situation takes place in bays, where the excessive presence of nitrogen and phosphorus salts in connection with the decrease in the oxygenation result in the threat to ecosystems. Oxygen shortage has been present for many years in the Bornholm, Gotland and Gdańsk abysses as well.

In the last years in the composition of the ichthiofauna of the Polish sea zones there were noticed the changes of the mutual ratios caused by the dramatic reduction in the cod and herring shoals populations. The decrease in the catch size of some species drew attention to the need for preservation and more effective use of the Baltic living resources. The catch of the Baltic fish is regulated by the international agreements.

The catch limits are assigned by the International Baltic Sea Fishery Commission IBSFC which defines a total admissible catch range in the Baltic Sea and makes a distribution of the catch limits in national fishing zones. In order to secure the resources renewal a programme of fish protection is conducted. Due to the introduction of close seasons and protective zones the access to breeding grounds is limited. The appropriate regulations define the parameters of the technical means used in fishery , among others the size of stitches in nets. The allowable catch of fishing vessels which increased dramatically as a result of the introduction acoustic methods of fish finding, is also supervised. In the case of some species a stocking is used. In this way a small wild population of salmon is enlarged, and, consequently, as many as 90% caught salmons come from the stocked material. All marine mammals living or appearing seasonally in the Baltic Sea are under full species protection which helps a slow reconstruction of original fauna of Baltic mammals. For many years at the Hel Marine Station of the Faculty of Oceanography at the University of Gdańsk there is introduced the *Programme of Restoring Grey Seals and Purpoises in the Southern Baltic Sea*.

A huge part of the Polish Baltic Sea coast and coastal waters are subject to various forms of legal protection. These are first of all two national parks – Wolinski and Slowinski (the second one



recognized by UNESCO as the World Biosphere Reserves) and a few landscape parks. Along the coast there were also established numerous protected landscape areas (eg. on Żuławy Wiślane) and nature reserves. On the basis of the Helsinki Convention, there was established Baltic Sea Protected Areas BSPA that covers 62 regions. So far Poland reported four areas – the Woliński National Park, the Słowiński National Park, the Coastal Landscape Park, the Vistula Spit Landscape Park. Currently a discussion is being led on the widening this system with open sea areas. Some sea and coastal areas were placed on the list of the Natura 2000 European Ecological Network.

The crucial task, aimed at removing arrears in water and sewage management system and influencing directly the Baltic Sea waters purity, is to equip agglomerations with the collective sewage system and sewage treatment plants. In 2003 The National Program of the Municipal Wastewater Treatment was created. Its introduction requires the expansion and/or modernisation of over 1100 municipal sewage treatment plants in about 1577 agglomerations as well as constructing about 37 000 km of a sewerage network. Currently there are over 1000 municipal investments at various stages of development (mainly sewage treatment plants and sewerage networks) financed firstly by the Instrument for Structural Policies for Pre-Accession (2000-2003) fund, by the EU Cohesion Fund (2004-2006), and now within the framework of the *Operational Programme 'Infrastructure and Environment'* (2007-2013).

The programme also involves the domestic financial sources, among others: the National and provincial funds for the environmental protection and water management, the EcoFund Foundation, Environment Protection Bank BOŚ S.A. The taken actions should soon produce substantial effects, resulting in the decrease in the loads of biogenes transported by Polish rivers to the Baltic Sea.

In 2005 the government document *The Water Management Strategy* till 2020 was accepted. The executive programme for the strategy includes the investment actions, and their introduction has a direct influence on the environment of the Baltic Sea (eg. the modernization of dikes, the protection of the Great and Gdańsk marshlands). There are also included some non-investment actions, eg. the introduction of the Water Framework Directive, developing plans of water management in the basins of the Vistula and the Oder as well as the *Vistula River 2020 Programme*. Since 2005 the work on the Programme for Delta, aimed at the economic activation and the development of the tourism of the Vistula and the Vistula Lagoon estuaries, has been accelerated.

In 2003 according to the regulations of the *Strategy of Coastal Protection* prepared by the Minister for Infrastructure and maritime offices, the *Programme of Coastal Protection* was accepted. It assumes the construction, development and keeping the system of the anti-flood safety of coastal area; ensuring the stabilization of the shore line and preventing beach vanishing as well as monitoring sea shores. The governmental *Programme of Coastal Protection* is supposed to be carried out for 20 years (2004-2023) with the financial participation of the state budget and UE financial support. Apart from the natural factors the condition of the coast fortifications is also influenced by illegal building in the area of the protective zones, and particularly on the cliffed coast. The scale of the revealed cases of illegal building proves the common character of braking the regulations of the Building Law. A serious threat especially to the dune zone on the Polish coast of the Baltic Sea is also the increasing pressure from tourism.

#### *Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

In 2006 the first stage of the *Puck and Gdańsk Bay Waters Protection Programme* was implemented due to efforts of provinces and the Voivode of Gdańsk with the financial help from the National Fund for Environmental Protection and Water Management and the Provincial Fund for Environmental Protection and Water Management and the EcoFund Foundation. Within the framework of the first stage there were built 38 sewage treatment plants in coastal cities and within 50 km from the coastal line. The spectacular effect of the programme was the opening of almost all seaside resorts. Another interesting example of the local self-governments activities is the implementation of the *Programme of Restoration and Protection of Natural Fish Resources in the Pucka Bay* by the Gminas Municipal Society in Władysławowo. It is aimed at the protection of the natural habitats and ecological processes, restorations of native biological diversity, restitution of endangered native fish species, restitution of natural or constructing artificial spawning grounds, plus conducting stocking as well as reduction of environmentally unwanted species, eg. the three-spined stickleback and the round goby.

Poland participates actively in all international initiatives taken for the improvement in the Baltic Sea ecological condition. In 1973 in Gdańsk there was accepted the Convention on Fisheries and the Protection of the Baltic Sea Living Resources. In the following year in Helsinki the Convention on the Baltic Sea Area was accepted. Due to political, economic and social changes in Middle and Eastern Europe and because of a need for establishing comprehensive rules of the Baltic Sea protection, in 1992 a new convention was prepared and signed by Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Russia, Sweden and the European Community. The aim of the Helsinki Convention is the protection of the marine environment of the Baltic Sea (the waters, the bottom, the living resources) against the impurities coming from all sources – land, ships, and the atmosphere. The increase in dangers to the sea environment noted in the 1970s and 1980s resulted in organizing in 1990 in Ronneby, Sweden the Conference on the Baltic Sea with the participation of the Baltic countries prime ministers and the representatives of the Czech Republic, Norway, the European Council and 4 international banks of development. Then the Baltic Sea Declaration 1990 was accepted. Its continuation was the Baltic Programme 1992, implemented in 1993-2012. It included the investment actions in chosen sources of pollutions (so called *hot spots*). Originally 132 hot spots in the Baltic Sea were identified and marked on a special list, most – 37 – in its Polish part. The Ministry of the Environment expects that before the end of the Baltic Programme (by 2012) all Polish municipal and industrial hot spots on the list will have been removed. Numerous programme and investment activities also influence the improvement of the condition of the Baltic Sea. They are introduced within the framework of the International Committee for the Oder Protection against Pollutions and a long lasting *Programme for the Oder – 2016*, aimed at constructing in the years 2002-2016 a system of integrated water management in the river basin including the anti-flood protection, the water purity protection, the cultural and natural environment protection, plus the general economic and consumptive needs of the society.

#### **Protection of mountain areas**

Actions aimed at preserving biodiversity are taken according to present possibilities taking into consideration the degree of sensitivity of particular areas of the country to anthropopression. It refers mainly to mountains and forelands.

Mountain areas elevating over 500 meters make over 8% of the territory of Poland. They cover mainly south of Poland: the Carpathian Mountains, the Sudetes and the Świętokrzyskie Mountains. In mountain and piedmont regions there are numerous relatively untransformed areas with unique diversity of animated and unanimated nature and outstanding landscape and cultural values. Polish mountains are the area of an intensive tourist movement and intensifying pressure on the intensive tourist management. They are also an important habitat as well as water and retention area which has a particular meaning for the observed in 1990s dangerous tendency for temporal deforestation of mountain slopes and dying damaged forest stands. Intensive decay of coniferous forest stands characteristic of an ecological disaster, including especially the fir tree, reached mainly the Sudetes, where in 1980-1995 the forest area decreased by over 15 000 hectares. However, thanks to the effective implementation of the programme for providing all significant sources of pollution in the Polish, Czech Republic and German borderland with filtering mechanisms the process has been stopped. Simultaneously, an intensive afforestation is being run.

In 19<sup>th</sup> century the western part of the Carpathian Mountains, particularly the Silesian Beskids and a significant part of the Żywiec Beskids were transformed from the typical of the beech, fir and spruce forests into the large scale of production spruce cultures. Residual remains of the fir were eliminated from the forest stands in 20<sup>th</sup> century as a result of the influence of industrial emissions from the Upper Silesian Industrial Region and Karwinski-Ostrawski Industrial Region.

The incompatibility of the species composition with the forest habitat composition became initiating factor of the observed since 1960s increase in the parasitic activity of the honey fungus influencing negatively the health condition of spruce woods. Climatic changes observed in a last few years, and mainly dramatic lack of the rainfall in the growing season plus high temperatures actuated disease processes. As a result since 2006 there has been a need for implementing increase sanitary cuts reaching about 1 million m<sup>3</sup> of deadwood per year.

For over 50 years in this part of the Beskids there has been conducted a reconstruction of forest stands, reconstructing the previous species diversity. The works speeded up in 2002 after development of the *The Programme for the Beskids*. It defined the schedule for the reconstruction of forest stands. The actions logistics was also worked out. In spite of intensive prevention activities, in the last three years there has been noticed an increased tree decay, and as a result, the decay of the Beskids forest stands. The changes force the development of amendments into the *Programme*.

The most valuable environmental qualities of Polish mountains were covered with legal protection. At present in this area there are 9 national parks, 24 landscape parks and over 200 nature reserves. On the territory of southern upland and mountainous provinces there were also established 55 protected landscape areas as well as other protection forms, such as ecological sites, nature and landscape complexes and documentary sites. The Polish membership in the European Union also forces the duty of marking Polish areas for the European Ecological Natura 2000 Network. In the modified and consecutively broaden Polish version of Natura 2000 sites reported to the European Commission there are a few dozens protection sites of environmentally valuable areas in the Carpathian Mountains, the Sudetes, the Świętokrzyskie Mountains and on the foothills. Mostly these are special areas for habitat conservation.

*Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

Since 1993 in the Eastern Carpathian Mountains there has existed the Polish-Slovakian-Ukrainian Transboundary Biosphere Reserve including, on the Polish side, two landscape parks (the Cisna-Wetlina and the San Valley) plus the Bieszczady National Park. Since 1994 the Tatra National Park and Slovakian Tatra Mountains have also been the Transboundary Biosphere Reserve, and the Babia Góra National Park (since 1977) and the Karkonosze National Park (1992) – Biosphere Reserves.

In 1997 the Polish Parliament passed the regulation on the sustainable development of mountain and mountainous area. The document states that the lay of the land, the climate and the heritage of natural and cultural values in this area demand the implementation of specific mountain policy for their the management and protection. Two years later the government prepared *The Principles of the Strategy of Social and Economic Activation of the Mountain and Mountainous Areas*. As the strategic goal there was chosen the sustainable development of mountain areas through the improvement of living conditions and the attractiveness of management taking into consideration the specific character of this area, resulting mainly from ecological conditions. Despite the fact that *the Strategy of Social and Economic Activation of the Mountain and Mountainous Areas* shows some features of a government document, since 1999 it has been implemented on the regional level. The question of the specific economic and environmental character of mountain areas appears also in some documents referring to the environment protection, e.g. in the *National Environmental Policy* later continued in the *National Environmental Policy for 2003-2006 including Perspectives for Years 2007-2013*, and in the acts: Water Law (2001), Environmental Protection Act (2001) and in the Act on Nature Conservation (2004). Poland is a signatory of the European Landscape Convention signed in Florence in 2000, aimed at promoting protection, management and landscape planning as well as development of European cooperation on landscape issues. Also the spatial planning act of 2003 while planning forces to take into consideration landscape values (though it still does not fully implement provisions of the Landscape Convention).

In 2002 the Council of Ministers accepted the *Strategy for the Tourism Development for 2001-2006*, and in 2005 its modified version for 2007-2013. In these documents tourism is pointed as one of the sectors that can ensure the sustainable development. Among the tasks connected with mountain areas there are among others: increasing the tourist attractiveness of health resort gminas and health resorts aimed at the development of the tourist and holiday functions, preparing the system of facilities and model solutions for the development of the pro-ecological tourist infrastructure in protected areas. The National Fund for Environmental Protection and Water Management takes an active part in the above action which results in building and the development of the ecological education centres and museums of natural history in all national parks in the mountain areas. For many years The National Fund for Environmental Protection and Water Management has also been the main source of grants for the development of tourist infrastructure and educational, environmental and scientific activities in national parks.

In 2006 Poland ratified the Framework Convention for the protection and sustainable development of the Carpathians. There are was considered as a unique natural treasure of a great beauty and ecological value, as well as an important reservoir of biodiversity, the headwaters of major rivers, an essential habitat and refuge for many endangered plant and animal species, and Europe's largest area of virgin forests. The Carpathian Convention based on the Convention on

the Alps Protection is supposed to be the bases for strengthening the cooperation between Alpine and Carpathian countries. The provisions of the Carpathian Convention refer mainly to: the integrated management of land resources, the protection and sustainable use of biodiversity and landscape diversity, spatial planning, sustainable and integrated management of the river basin waters, sustainable agriculture and forestry, sustainable transport and infrastructure, tourism, industry and cultural heritage.

The Polish accession to the EU resulted in big and profitable changes in the mountain areas management. Even in the pre-accession period over 60 gminas in 5 provinces in southern Poland were included into the groups with unfavourable production conditions. According to the Common Agricultural Policy of the EU, that has been used by Poland since 1 May 2004, it was accepted that mountain areas, because of their specific character, require a bigger input of work, means for production and equipment, but also a considerable limiting the use possibilities.

While choosing areas with unfavourable usage conditions, it was assumed that only gminas where over 50% of arable land is located over 500 meters can be qualified for unfavourable production conditions. According to the *Rural Development Programme* farms in the area of unfavourable production conditions can obtain additional financial support (apart from the tools of the Common Agricultural Policy for all agriculture) which compensates for the difficulties of the farm beyond unfavourable production conditions zones. Such farms are forced to carry out the strict duty of leading so called *common good agricultural practice* with the respect for the environment. It refers mainly to the sensible mineral and natural fertilizers management, following the rules for soil and water protection, preserving valuable plant and animal species from rural areas, and agricultural landscape protection.

Numerous scientific and social institutions in Poland attend the issue of the sustainable development of mountain areas. The research on the state of the environment and its protection, as well as on economic and cultural specific in Poland enjoy a long and established tradition. Since 1957 within the structure of the Polish Academy of Sciences there has been functioning the Committee on Management of Mountain Regions. Its tasks include among others: forest, agricultural, hydrologic, environmental protection and tourism issues. It also takes care of the scientific analysis and synthesis of conditions and needs for the sensible cultivating of mountain regions. With the participation of the Polish Ecological Club there are also made attempts for integrating non-governmental organisations for the protection and development of the *Carpathian Mountains Ecosystem*. Since 1999 there have been operating the society *Carpathian Heritage* taking active part in solving the most important problems referring to the protection of cultural and natural values in the region.

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All the presented activities referring to the preservation, enrichment or reconstruction of the lost components of the biological diversity will help to perform the duties defined in articles 8 and 9 of the Convention on Biological Diversity and to reach goals of the Strategic Plans of the Convention and the Millenium Development Goals. However, obtaining complete effectiveness of the taken actions will require solving of numerous present problems and eliminating difficulties. Special attention should be paid to the facts that:

*Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

- some areas of high natural values stay behind the system of protected areas. There is a lack of sufficient instruments for the biological diversity preservation beyond protected areas; a lack of legal basis for establishment of ecological corridors; insufficient regime for protected areas; difficulties in gaining social acceptance for creating new or widening old protected areas, including Natura 2000 sites;
- the area of 'the reference sites' making it possible to follow natural processes (protected areas under strict protection and other unused parts of space) is insufficient;
- the number of the accepted management plans for the protected areas is insufficient;
- the financial means for the development of the environmental research and maintaining the scientific potential are unsatisfactory;
- the number of species under the species restitution and reintroduction programmes is insufficient and the range of the actions taken is limited;
- there is an unsatisfactory assessment of the influence of collection of wild living fungi, plants and animals on the status of their local populations. The supervision of the sites and number of the collected specimens is not proper.
- there is insufficient promotion of the reference books on the protection of the natural habitats and protected species listed in the Habitats Directive and the Birds Directive. There is lack of recommendations on the protection of some habitats;
- the financial means for the operating of the environmental protection services and the number of vacancies are insufficient with relation to the needs.

**3.4 Complete integration of the actions aimed at the biological diversity conservation with the sectors of economy influencing this diversity as well as the public administration and the society (including non-governmental organisations) with keeping proper proportions between the environmental balance and the social and economic development of the country**

Accepting supreme assumption that the effectiveness of the actions taken for the protection and sustainable use of the biological diversity to much extent depends on their integration with the actions taken both within the framework of particular sectors and intersectoral connections, lay at the basis of creating and accepting for implementation numerous legal, strategic and programme documents by the state authorities.

The requirement of the protection and sustainable use of biological diversity was set out in the primary legal act namely the Constitution of the Republic of Poland officially accepted in 1997 by the National Assembly. Its article 5 points that the Republic of Poland ensures the protection of the natural environment pursuant to the principles of the sustainable development. This obligation was developed in the *II National Environmental Policy* accepted by the Council of Ministers on 13 June 2000, and then in August 2001 by the Polish Parliament. The document states that the protection of the biological and landscape diversity is crucial for the country's

ecological security. Therefore the tasks of the state authorities include creating conditions that support this protection.

The following points were recognised as the most important objectives in this field:

- improving the status of the natural environment by removing or limiting the threats to preserving the biological and landscape diversity;
- preserving, reconstructing and enriching natural resources;
- gaining common approval for preserving the whole Polish natural and cultural heritage.

The above objectives were specified and detailed in the *National Environmental Policy for 2003-2006 including Perspectives for Years 2007-2013* accepted by the Parliament in May 2003. As the most important actions were considered the ones aimed at:

- renaturalisation and renovation of the most valuable devastated ecosystems and natural habitats, particularly the forest and wetland ones;
- restitution of selected species (in the justified cases);
- the expansion and improvement of the *in situ* and *ex situ* protection of endangered plants and animals plus old traditional plant varieties and the livestock breeds important to the biological diversity protection by developing and maintaining necessary technical conditions and supporting research in this field;
- the development of the research and inventory work to assess the status of biodiversity and to identify the threats to it;
- the maintenance of the diversified agricultural landscape with medium size farms plus enlarging the support for and the development of the forms of agriculture using the methods which do not disturb the environmental balance, first of all organic and integrated agriculture;
- ensuring the protection and efficient use of the biological diversity on the whole territory of the country, including sea areas and other lands used intensively as well as urban areas;
- the increase of the environmental awareness of the society and local level authorities, among others by the promotion of the biological diversity issues during trainings and informative campaigns as well as improving social communication within the framework of the understanding of goals and the effects of the biological diversity protection;
- the promotion of the wise use of the biological resources and the practices of sustainable management, so as not to destroy the natural resources more than it is necessary; pointing local benefits of maintaining the landscape and biological diversity;
- maintaining traditional economic practices in the environmentally valuable areas as the tool of protection and sustainable use of biological resources taking into consideration the *Code of Good Agricultural Practice*;

*Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

- ensuring an effective counteractions aimed at the species that can endanger the integrity of natural ecosystems and habitats or endanger native species;
- further afforestation of the country taking the nature and landscape conditions into consideration;
- introducing into the forest management the technologies that imitate the processes and conditions characteristic of natural changes dynamics in the forest stand and ecosystem;
- ensuring the protection of the forest genetic resources;
- the implementation of the principles of the protection and enhancement of biological diversity on the genetic, scientific and ecosystem levels in forests, among others by introducing native species, enriching the species composition and the reconstruction of monocultures.

*The National Environmental Policy for 2009-2012 including Perspectives till Year 2016* accepted by the government in December 2008 also pointed at the fact that the primary goal is to ensure the ecological security of the country (of the citizens, environmental resources and social infrastructure) as well as creating basis for the sustainable social and economic development. The goals of the document include:

- enhancing the system of the environmental protection management,
- the protection of the natural heritage and sustainable use of natural resources,
- sustainable use of raw materials, water and energy,
- further improvement in the environment quality and ecological security for the protection of the health of the inhabitants of Poland;
- climate protection.

The recommendations and instructions referring to the protection and sustainable use of the biological diversity can also be found in other documents of a strategic character accepted by the Council of Ministers, eg.:

- *The National Forest Policy* that assumes ensuring of forest stability and their multi-functionality thanks to enlarging forest resources and their complex protection as well as the reorientation of the forest management from the previous domination of the raw material model to the proenvironmental and economically sustainable, multifunctional forest management;
- *The National Strategy for Environment Education – through Education to Sustainable Development* that assumes taking actions aimed at enhancing of the social knowledge and awareness on the status and threats to the biological diversity;
- *The National Development Strategy for 2007-2015*, defining the goals and priorities of the social and economic development of Poland as well as the development of the environmental protection infrastructure within the framework of the natural and biological diversity protection;
- *The National Strategic Plan for Development of Rural Areas* which, basing on the social, economic and environmental analysis, defines the priorities and developmental directions of Polish rural areas in relation to the community priorities;



- *The National Cohesion Strategy 2007-2013, Operational Programme 'Infrastructure and Environment'* which gives priority to: the reconstruction of the environmental habitats and mainstays in protected areas; preserving endangered species and plant, animal and fungi genetic diversity; restoring the permeability of landscape corridors; supporting the process of development of management plans as well as enhancing the social awareness on the natural, landscape and environmental protection.

Financial conditions, namely the state's ability to spend financial means on the level adequate to the needs of biological diversity protection and sustainable use, are a crucial indicator conditioning the effectiveness of performing duties included in sectoral policies, strategies and programmes.

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The taken actions referring to the implementation of national plans, strategies and programmes result in carrying out the Article 6 of the Convention on Biological Diversity and the goal 3.1. of the Strategic Plan of the Convention and the Millennium Development Goals. However, their effective implementation meets numerous difficulties, namely:

- insufficient formulation of the nature protection issues in policies , strategies, and programmes of certain sectors;
- too general treatment of the issue of biological diversity protection and sustainable use in programme and strategic documents that are in force on the regional (provincial) level;
- omitting the question of biological diversity protection and sustainable use in the development strategies of gminas and in environment protection programmes;
- lack of practical guide books related to the methods of the sustainable use of biological diversity (in various sectors).

### **3.5 Broadening the knowledge and shaping attitudes and social activity on the protection and sustainable use of biological diversity**

As the result of reforms of the educational system on the primary and secondary school levels carried out at the beginning of 20<sup>th</sup> century, the ecological issues are implemented in two dimensions. One of them, operating till 30 January 2009, was an educational path entitled *the environmental education*, which appeared in secondary schools, profiled colleges and technical colleges in the form of a set of educational contents and skills of an important educative meaning and could be used within teaching various subjects (subject blocks) or within the framework of separate classes. The second dimension of the environmental education appeared in traditional subjects such as biology, geography, chemistry, physics and history. The thematic range presented within individual subjects allows for implementing a holistic ecological education on all educational stages. Moreover, *the core curriculum* gives consideration to responsibilities from the field of education resulting from international conventions ratified by Poland therein from the Convention on Biological Diversity.

Higher education of all types play a crucial, though still insufficiently used role in shaping the ecological awareness and knowledge. However, in the last few years important changes in the interest of high schools in nature protection and sustainable development issues have appeared, both in research and didactics. Not only state schools and departments but also private ones showed interest in educating in this field. Since 2005 among about 200 high schools, the subject of environmentalism plus the questions of biological diversity have been discussed at half of various specializations, sometimes having little in common with ecological issues (eg. at military schools). The specialization of *environmental conservation* is present in undergraduate studies, complementary graduate studies or graduate studies at about 50 high schools therein at all universities and agricultural high schools.

As a result of an increased interest in problems referring to environment and sustainable development, organisational units appointed for coordinating education in this field started to be established at Polish high schools. In 2005 at all important academic centres there operated the school or inter-school centres for environmental protection. Quite often they were also responsible for conducting an interdisciplinary studies specialization. Faculties of natural sciences (biology, geography ) are traditional promoters of such centres. However, law, management, economics, sociology, political sciences, pedagogy and agricultural specializations also play here an important role.

Ecological education is an important element of citizenship education aiming at developing the society that knows the problems of the sustainable development. *The National Strategy for Environmental Education* is a strategic state document regulating this question. It identifies and hierarchizes the main goals of ecological education, at the same time pointing the possibilities of their implementation. One of the basic points of the strategy is an assumption that ecological education should cover the whole society , all age and professional groups, as well as central and local authorities. Simultaneously, in the act on education system, amended in 2003, there was included a notation saying that: the education system particularly ensures among children and youth the popularization of the knowledge on the conditions of sustainable development as well as shaping attitudes supporting its implementation, on the local, national and global scale.

An extremely crucial element of shaping ecological awareness of the society is the forest education led by the State Forests. It can be defined as an element of ecological education aimed at popularization of knowledge on the forest environment, multifunctional and sustainable forest management, relationships between humans, society and forest environment (essential for biological diversity) as well as building trust to foresters. Increasing the society's awareness of sensible and responsible use of forest functions is very important for the protection of biological diversity.

Because of a special attention paid by foresters to the field character of their activities, forest educational paths seem to play here a crucial role. There are over 800 such paths on the territory of Poland. Additionally, forest education is introduced on the basis of 40 education centres, over 200 forest education chambers, about 450 forest education shelters, over 1,300 forest education points and about 1,600 other places. The fact proving the involvement of the State Forests is that about two million people make use of various types of forest education aimed at different social age groups.

Civil society organizations play a special role in shaping the ecological awareness of the society. At present there are operating a few hundred ecological organizations of various structures and the range of influence. It refers not only to the accepted organisational forms, areas and methods, but also to the ideological basis characteristic of particular groups and communities. Currently the diversification of the Polish ecological movement is also caused by specific conditions of its development, namely: specific cultural hereditary (eg. lack of the voluntary service tradition), fast changes in the movement environment as well as the variety and number of problems related to the environment protection, including the nature protection. The main goal of the statutory activities of most organisations is education and making the society aware of ecological problems through the promotion of issues related to the nature protection among various social and professional groups. These actions include not only informing the authorities and the society about problems and phenomena, but also informing about the level of threats as well as promoting ecological standards of living, working, producing and relaxing. The following organisations are particularly focused on educational activities for the protection and sustainable use of biodiversity: the Polish Ecological Club (Polski Klub Ekologiczny), the Polish Society for the Protection of Birds (Ogólnopolskie Towarzystwo Ochrony Ptaków), the Polish Society of Wildlife Friends 'pro Natura' (Polskie Towarzystwo Przyjaciół Przyrody *pro Natura*), the Workshop for All Beings (Pracownia na rzecz Wszystkich Istot), the Polish Society for Nature Conservation *Salamandra* (Polskie Towarzystwo Ochrony Przyrody *Salamandra*), the National Foundation for Environmental Protection (Narodowa Fundacja Ochrony Środowiska), the Naturalists' Club (Klub Przyrodników).

An important role in raising the social awareness and knowledge of the nature protection and sustainable development is played by the Department of the Ecological Education operating within the structure of the Ministry of the Environment. The range of its activities includes the presenting the media, institutions and non-governmental organisations with the basis of the national ecological policy, and moreover:

- initiating and implementing educational and promotional campaigns;
- initiating and coordinating educational, promotional and informative events, fairs and actions that popularize actions taken by the Ministry of the Environment;
- coordinating the issues referring to the competitions organised by the Minister of the Environment in cooperation with other departments of the ministry;
- preparing, promoting and disseminating documents, publications and film on the environment protection;
- coordinating the implementation of the *National Strategy for Environmental Education*;
- coordinating the issues referring to the implementation of the Convention on access to information;
- running the website for children as well as the library of the Minister of the Environment;
- coordinating the cooperation of the Ministry of the Environment with non-governmental ecological organisations;

*Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

- implementing tasks referring to running secondary forest schools on behalf of the Minister of the Environment, including exercising the pedagogical supervision;

In 2004 the Department of the Ecological Education made an inventory and verification of the local centres and organisations engaged in ecological education. Moreover, it published a guide book on this subject and prepared an electronic data base of the offices of this type. These actions were aimed at appointing the centres with the best educational offer and organisational arrangement.

The centres of ecological education perform a crucial stimulating function as far as broadening the society's ecological awareness and knowledge is concerned. Their tasks also include initiating, coordinating and running trainings, educational campaigns plus organizing conferences and seminars as well as developing an editorial activity.

In 2008 on the order of the Ministry of the Environment dr Anna Kalinowska published a book entitled *'Article 13 – in search of social support in the Convention on biological diversity management'* („*Artykuł 13 – w poszukiwaniu społecznego wsparcia w zarządzaniu Konwencją o różnorodności biologicznej*”) containing the summary of Polish experience in the development of ecological education against the world experiences.

Fast development of the ecological education in Poland observed in the last few years would not be possible without the financial support from the National Found for Environmental Protection and Water Management as well as from provincial founds for environmental protection and water management. The institutions collect and divide for ecological aims financial means (24-25 million zloty a year) coming from the charges for the use of the environment and fines for breaking particular environmental norms. They also finance the implementation of the national and regional educational programmes as well as informative campaigns, publishing books, leaflets, newspapers and magazines, buying equipment and didactic materials for schools and environmental education centres, film and educational TV programmes production, the organisation of conferences, trainings, contests, fairs, exhibitions, and other educational events.

Extensive activities for development of social awareness of importance and need for biodiversity conservation in agriculture and particularly native varieties of livestock are carried out by the National Research Institute for Animal Production. Special Displays of Native Animal Varieties during popular annual National Animal Breeding Fairs contribute to dissemination knowledge of conservation of genetic resources of animals. Besides, the Institute performs extensive publishing activity (“Native Varieties”, calendars, pamphlets dedicated to individual varieties subjected to conservation, etc.) For several years all the information on conservation of genetic resources programs and information for breeder are available on the National Institute for Animal Production website <http://www.bioroznorodnosc.izoo.krakow.pl/>. Special attention was paid to dissemination information on the aims of program implementation under the Rural Development Plan in years 2004-2006, the Rural Development Programme in years 2007-2013. Support for farmers who apply respective variants within the agro-environmental schemes consists in financial aid (agro-environmental payments) in order to:

- restoring values or maintaining the present state of valuable habitats which are used for agricultural purposes and maintaining biodiversity in rural areas;

- promoting sustainable farming system;
- appropriate use of soils and water protection.

Both extensive training of advisors and farmers as well as all the information materials contain information on the need for conservation of the above values.

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Efforts related to raising the knowledge, building behaviour and stimulating social involvement for protection and sustainable use of biological diversity contribute to discharging the obligations formulated in Article 13 of the Convention on Biological Diversity and its Strategic Plan as well as achieving the 2010 Target and Millennium Development Goals. Despite significant progress in the respect in recent years, there is still a number of problems, out of which the following deserve special attention:

- too slow increasing of environmental awareness of a part of society. Slow and insufficient process of applying available knowledge in every-day practice. Low priority of nature protection issues with politicians and civil servants;
- improper transfer of knowledge about the state of natural resources in Poland and overestimating the state of natural environment in Western European countries;
- progress in extending internet biological diversity data bases too slow;
- low level of public knowledge of the implementation of Natura 2000 network.

### **3.6 Improvement of the mechanisms and instruments supporting conservation and sustainable use of biological diversity**

Basic instruments determining efficiency of actions taken for biological diversity conservation include legal regulations defining the scope and ways of nature protection management and financial instruments that facilitate enforcement of relevant laws in practice. Important role is also played by systemic solutions improving nature management efficiency and instruments streamlining the decision-making processes.

#### **Legal regulations**

The first nature protection act was adopted in 1934. In 1949 it was replaced with a new act which, for the first time, emphasized not only protection of natural phenomena, but also rational management of natural resources. The social and economic changes that took place in Poland after 1989 called for adjustment of protection efforts to the new reality, which resulted in passing another nature protection act by Polish Parliament in 1991. Its provisions were aimed at development conditions that would enable conservation of environmental processes and sustainability of ecosystems, preserving the biological diversity and natural heritage, ensuring continuity of plant and animal species and their habitats, protection of vegetation in urban and rural areas, maintaining or restoring proper state of natural habitats and other nature resources and their components as well as fostering proper attitude of man towards nature.

The approaching Poland's membership in the European Union and the resultant necessity of adjusting national legislation to EU requirements was the main reason for passing a new nature conservation act in April 2004 by Polish Parliament. Based on the previous regulation, the new law incorporated some of the formal necessary requirements coming from the accession process as well as some proposals made by various opinion leaders, including non-governmental organizations. One of the added elements was significantly higher public involvement in decision-making processes requiring, in cases of important regulations, prior consultations with non-governmental organizations and local governments. Place was also made for representatives of local authorities and social institutions in such assessment and advisory bodies as: State Council for Nature Conservation, voivodship nature conservation commissions, and national and landscape park boards. The act also included a very important clause stating that provisions of the nature conservation plan were applicable to not only local spatial development plans but also in case of decisions on land development conditions. It means that a lack of a local spatial development plan would no longer make it possible to locate investments conflicting with conservation objectives in protected areas. Moreover, the act included some of the recommendations stemming from international obligations, in particular trade in wild protected species and introduction of alien species into natural environment. Natura 2000 sites, a new form of nature protection, were also introduced.

On 3 October 2008, Polish Parliament passed an extensive amendment of the law. Its purpose was to, among others, support complete incorporation of EU regulations into Polish laws, improve management of Natura 2000 areas, and ensure proper supervision by bodies that make decisions regarding limitations of natural environment use. In result of the changes and amendments the regulation gave nature conservation authorities a tool for influencing spatial development arrangements, including forest management plans, that could negatively impact protection of areas subject to conservation, through:

- obligatory consultations with national park directors regarding simplified forest management plans and recommendations resultant from inventories of forests overlapping national parks and additionally - forest management plans for protected areas buffer zones,
- obligatory consultations with regional directors for environmental protection, a newly created body, of spatial documents for nature reserve areas and their buffer zones, simplified forest management plans and recommendations stemming from inventories of forests that overlap nature reserve buffer zones, spatial management provisions that could negatively impact protection of landscape parks and areas of protected landscape and spatial plans in Natura 2000 sites.

The amended act also modified regulations determining the circumstances when the minister of environment issues permits for exceptions from bans in national parks and delegating some of its current competence for issuing the permits for nature reserves to General Director for Environmental Protection, a newly created body, and regional directors for environmental protection.

Many of the changes regarded Natura 2000 sites. The act specified such issues as the ways of supervising and managing Natura 2000 sites, extension of the scope of monitoring natural

environment components in the Natura 2000 sites and conditions for environmental compensations. It also introduced new conservation tools for Natura 2000 sites (so-called plans of conservation tasks), specified, in more detail, the ways of establishing and deleting Natura 2000 sites, and added “areas of importance to the Community” category to Natura 2000 sites. Furthermore, the obligation of social consultations with relevant stakeholders during development of both plans of conservation tasks and management plans was significantly extended.

In terms of species protection, the amended law limited the options of introducing derogations from bans for protected animal species to only the cases stipulated in the Birds Directive and Habitats Directive of the EU. The act also obliged the Ministry of Environment to determine the animal species or groups hazardous to life or health of people, conditions for keeping them in captivity and ways of marking. New regulations were also introduced; they defined distribution of competence between the authorities, appointing the General Director for Environmental Protection and regional directors for environmental protection as the bodies in charge of issuing permits for specified actions subject to bans or limitations related to protected species. Other issues covered obligation to obtain a permit from the General Director for Environmental Protection for crossing protected species, alien species and game species as well as keeping dangerous animals in captivity.

Irrespective of the amendment of the Act on Nature Conservation, the Polish Parliament passed, on 3 October 2008, an Act on Sharing Information on the Environment and its Protection, Involvement of Society in Nature Conservation and on Environmental Impact Assessment. It stipulated requirements for, among others:

- availability of information on the environment and its conservation;
- involvement of society in environmental protection;
- development of strategic environmental assessment of plans and programs;
- development of environmental impact assessment of planned undertakings;
- a code of conduct for trans-boundary environmental impact;
- functioning of commissions for environmental impact assessment.

Moreover, the act introduced new solutions for organization of environmental protection authorities. The main change was establishing specialized environmental protection services within state administration at the central and regional level. The services were to be headed by the General Director for Environmental Protection as the central state administration body reporting to the Minister of the Environment. At the regional level (covering individual voivodships), those would be regional directors for environmental protection, non-consolidated state administration bodies.

The solutions applied to organization of environmental protection authorities, combined with competence changes and provisions regulating the procedure of environmental impact assessment of various undertakings, led to vesting administrative proceedings in the hands of one institution, which ensured:

*Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

- transferring responsibility for environmental impact assessment proceedings to one body, thus reducing the time required for administrative procedures;
- limiting the number of issues that needed to be agreed, which led to shortening of the procedure.

The act defined, among others, the principles of appointing and dismissing General Director for Environmental Protection and his / her deputies and scope of competence, as the appeal body for decisions issued by regional directors for environmental protection. The position of the National Commission for Environmental Impact Assessment was also changed: it became an assessment and advisory body of the General Director for Environmental Protection. As specified in the act, the duties of the General Director for Environmental Protection included, in particular:

- taking part in executing environmental protection policy in terms of nature conservation and control of the investment process, as the appeal body for cases related to environmental impact assessment;
- control of responsibility for environmental damage, as a appeal body;
- collecting data and information about Natura 2000 network and other protected areas as well as of environmental impact assessments, as a body in charge of managing the areas and keeping an environmental impact assessment data base;
- taking part in strategic environmental assessments, as a body in charge of determining the necessity (or its absence) to assess environmental impact and setting the level of detail for environmental impact forecasts, as well as a body assessing draft project subject to the assessment;
- taking part in proceedings related to trans-boundary environmental impact, as a body mediating between the body running the environmental impact assessment on a national level and relevant bodies from the countries-parties to the proceedings;
- performing the tasks related to Natura 2000 network and specified in the act on nature conservation.

The responsibilities of General Director for Environmental Protection, as a state administration body in charge of issues related to environmental impact assessment and protection of Natura 2000 network, include cooperation with the Chief Nature Conservator and the State Council for Nature Conservation, and local governments responsible for environmental impact assessment and nature conservation, and ecological organizations.

The act also specified the territorial range of operation of regional directors for environmental protection (within voivodship borders) and defined their competence. As specified in the act, the duties of General Director for Environmental Protection included, in particular:

- taking part in strategic environmental assessments, as a body in charge of determining the necessity (or its absence) to assess environmental impact and setting the level of detail for



*Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

environmental impact forecasts, as well as a body assessing draft project subject to the assessment;

- assessing environmental impact of undertakings or taking part in the assessments as an advisory body;
- establishing and deletion certain forms of nature protection;
- protection and management of Natura 2000 sites and other nature valuable areas under protection according to the principles and in the scope specified in the act on nature conservation;
- issuing decisions based on the Act on Nature Conservation;
- holding the proceedings and executing other tasks specified in the Act on Preventing and Redress Environmental Damages;
- providing data for environmental impact assessment data base held by the General Director for Environmental Protection.

Moreover, the duties of regional directors for environmental protection included, within the organizational borders, fostering cooperation with local government bodies responsible for environmental impact assessment and nature conservation, and ecological organizations.

Important legal instruments influencing effectiveness of undertaken activities on biodiversity protection are legal acts regulating other sectors of managing the environment, but addressing also important nature-related issues. Particular role in the respect is played, among others, by the following acts:

- Water Law dated 18 July 2001: it regulated management of waters according to the sustainable development principle and, in particular, development and conservation of water resources, use of waters, and management of water resources. It also addressed ownership of waters and water-covered land, introduced management of waters according to a rational and comprehensive (river-basin-based) approach to surface and underground waters with consideration to their quality and quantity, regulated issues of using, protecting and developing water resources in Poland, defined a control system for use of waters, fees for using water and discharge of wastewater, as well as a system of penalties for breaching the law. The 2003 amendment partially transferred Water Framework Directive provisions to Polish legal system and verified and amended those clauses of the act that hindered proper management of waters. The act had been amended a number of times between 2005 and 2008 (on 3 October 2008, the last time) to incorporate subsequent recommendations from the European Union;
- Environmental Protection Law dated 27 April 2001: it defined principles of environmental protection and conditions of using its resources with consideration to sustainable development requirements. Numerous amendments have been passed; the one in 2005 was very extensive and aimed, among others, at adjusting national regulations to Community laws;
- Act on Spatial Planning and Development of 27 March 2003: it adopted sustainable development and order as the base for influencing spatial policy on both state and local level and

defined the code of conduct for cases related to determining principles of spatial management and designation of land. Furthermore, it regulated spatial planning and investment location processes and defined principles of public involvement in the process of making economic decisions;

- Forest Act of 28 September 1991, amended a number of times between 2005 and 2008: it introduced the principle of sustainable development to management of forest resources and timber;
- Act on Protection of Farmland and Forestland of 3 February 1995: it introduced the principle of rational land management, its restoration and improvement the usage value of lands;
- Act on Forest Propagating Material of 7 June 2001: it regulated domestic trade in seeds and seedling material and determined principles of trans-regional movement of the material;
- Geological and Mining Law of 1 March 1994: it regulated the scope, ways of use and protection of mineable resources and introduced a system of exploitation fees and penalties for breaches of law. The amendment of April 2005 fully incorporated the European Union's requirements regarding underground storage of waste into Polish law, while the amendments passed in years 2005-2007 simplified the procedures for exploitation of useful mineral deposits, obtaining licenses and running business related to those deposits to which the licenses were issued by starostes; it also further decentralized tasks by delegating competence to specific license-granting bodies and introduced new principles of setting exploitation fees;
- Act on Chief Environmental Protection Inspectorate of 20 July 1991, with numerous amendments: it introduced the State Environmental Monitoring System and principles of executing environmental laws at the central and regional levels;
- Act on Organization and Breeding of Domestic Animals 29 June 2007: its article 28 defined the ways of protecting domestic animals genetic resources.

### **Finances**

Efficiency of actions taken for protection and sustainable use of biological diversity depends, to a very large extent, on effective use of the financial instruments that support execution of tasks and undertakings stemming from the adopted strategic documents and regulations. Basic sources of funding for such actions include EU's programmes and designated environmental funds to which Poland is a beneficiary. Key of those include:

National Fund for Environmental Protection and Water Management (Narodowy Fundusz Ochrony Środowiska i Gospodarki Wodnej - NFOŚiGW), celebrating its 20th anniversary in 2009, is a pillar of Polish environmental protection funding system. The key objective of the NFOŚiGW lately has been effective and efficient use of funding from the European Union allocated for development and modernization of environmental protection infrastructure in Poland. Domestic source of NFOŚiGW's funding are fees for economic use of environment and penalties for breaching environmental law as well as fees pursuant to the act on recycling of disused vehicles.

#### *Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

Loans and subsidies as well as other forms of funding used by NFOŚiGW are designated for financing, most of all, major investment projects of national and supraregional scale and regarding elimination of water, air and land pollution. Other tasks financed include tasks from the fields of geology and mining, environment monitoring, preventing environmental threats, promoting environmental knowledge, children health prevention, and research and development works and expertise.

The NFOŚiGW takes particular care of nature protection and survival of the most endangered species of animals and plants as well as building the public ecological awareness. Nature and landscape protection and support given to forestry are its priorities. Although nature, landscape and forests protection, on the average, has made up 3% of NFOŚiGW's total spending on protection of environment and water management recently, the impact upon the fields has been still significant. Between 1989 and 2007, over 1000 contracts regarding „landscape and nature protection” were concluded and the subsidies amounted to over 257 million PLN.

Financing investment and non-investment projects (mainly subsidized) for landscape and nature protection, NFOŚiGW has recently supported, among others, the following programs of species conservation:

- *Restitution and restitutional breeding of bison* in 7 closed and free-roaming herd bison breeding centres.
- *Active protection of capercaillie and black grouse program*: creation of a breeding program in Wisła Forest District and introducing protection of the bird species in Polesie National Park;
- *Program for active protection of bats in Poland*: co-financing of protective activities in, among others, „Nietoperek” reserve and other bat sites in Wielkopolska region;
- *Pond terrapin protection program*: establishing of a breeding center in Polesie National Park;
- *Mountain Apollo restitution program in Pieniny National Park*: population of satisfactory size achieved;
- *Migratory fish restitution program*: program conducted in selected areas of Poland aimed at reconstruction of the population of, among others, vimba, salmon and brown trout.

Besides the mentioned programs, NFOŚiGW co-funded actions for growing populations of selected animal species, including:

- common kestrel (increasing the number of nesting sites), white-throated dipper, peregrine falcon, common shelduck, black stork, Eurasian eagle owl,
- golden eagle, lesser spotted eagle, greater spotted eagle: building nesting platforms and developing the biotopes,
- Malopolska and Hucul horses: developing preventive breeding sites.

The landscape conservation activities included financial support for restoring natural attributes of most precious garden and park layouts in Poland. Such activities cover, among others:

*Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

- Museum - Łańcut Castle, Museum – Łazienki Królewskie, The Zamoyski's Museum in Kozłówka, Museum – Wilanów Castle;
- palace park in Puławy, manor park in Żelazowa Wola;
- palace parks in Antonin, Kórnik, Rogalin;
- spa parks in Kudowa-Zdrój and Szczawno-Zdrój.

Another field of NFOŚiGW operation is co-funding of undertakings in national parks. From 1989 to 2006 the NFOŚiGW transferred almost 212 million PLN to 23 Polish national parks, financing undertakings of total cost exceeding 340 million PLN. The projects supported included not only investment tasks (such as education centers and natural museums, wastewater treatment plants, technical infrastructure), but also undertakings of non-investment nature, related to, for instance, forest ecosystems and other land and water ecosystems, fire protection, environmental education, organization of tourist traffic and conservation of biological diversity. It is estimated that the Fund's financial support for continuing current scientific, didactic and educational activities in 23 Polish national parks amounted to 25-30% of the annual spending on nature protection.

Adopted in August 2008, *Strategy of the National Fund for Environmental Protection and Water Management*, formulating goals for nature protection in years 2009-2012, specifies that the co-financing will cover active conservation of nature protection in protected areas in Poland aimed at limiting natural environment degradation and losses of biological diversity resources according to *National Strategy for Conservation and Sustainable Use of Biological Diversity* and *National Forest Policy*. Other initiatives that will be legible to the support include actions for conservation of endangered species and genetic diversity of plants, animals, and fungi as well as restoring diversity in ecological corridors for ensuring proper operation of Natura 2000 network. Furthermore, the document emphasized that proper realization of conservation goals in such protected areas as nature reserves, national parks, landscape parks and Natura 2000 sites requires supporting the process of developing management plans and plans for protection of selected species or natural habitats. It is also necessary to restore proper conservation status of natural habitats in ecosystems and shelters of species, especially in Natura 2000 sites.

EcoFund Foundation has actively operated since 1992. The basic source of EkoFund's income are Polish debts for environment swap from the United States, France, Switzerland, Italy, and Norway. Between 1992 and 2007 EcoFund spent in total about 1,7 billion PLN on co-financing of about 1500 projects in five priority sectors. One of the sectors is conservation of biological diversity. The fund has spent in total 250 million PLN on such projects, which amounted to 15% of all the spending, including 15,5 million PLN in 2004 on 95 projects, 13 million PLN in 2005 (89 projects), and 14 million PLN in 2006 (88 projects).

Financial support was provided by the EcoFund through various dedicated contests with the subsidy as the main prize. Those covered the following fields:

- protection of most precious natural phenomena in national parks and landscape parks;
- protection of endangered plant and animal species;

*Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

- protection of wetland areas;
- protection of special protection areas covered by Natura 2000 European Ecological Network;
- increasing retention in forest areas.

The Fund actively generated particularly desired projects in another way, namely by developing own, multi-year sectoral and regional programs aimed at comprehensive solving of important ecological issues. Presented to the public by EcoFund, the program, along with declared significant financial support for all the constituent tasks, usually was to potential beneficiaries a strong incentive for active involvement in taking part in the proposed undertakings. The support formula provided for funding of projects in the following programmes:

- effective protection of eagles and other endangered birds of prey (program scheduled until 2010);
- protection of white stork in Poland;
- protection and reintroduction of pond terrapin;
- protection and reintroduction of forest cocks (black grouse, capercaillie);
- revitalization of forests in West Sudety Mountains (Karkonosze Mountains, Izerskie Mountains);
- protection and restitution of domestic species of migratory fish;
- protection of environment purity in Bory Tucholskie forests;
- restitution and reconstruction of fir in Sudety Mountains;
- protection of bison in north-eastern Poland.

LIFE+ Financial Instrument is continuation of LIFE Financial Instrument used in 1992-2006 which provided co-funding for the following projects:

- protection of Baltic high peatland in Pomorze: a project aimed at limiting the process of draining and drying of peatland;
- protection of the aquatic warbler: a project focused on improving nesting conditions and increasing the area of the species nesting grounds;
- protection of bison in Białowieża Forest: a project for enlarging the range of the bison, bettering its feeding base and habitat and improving management of the species.

LIFE+ is the only financial instrument of the European Union focused exclusively on co-financing environmental protection projects. Its main goal is supporting the process of implementing Community environmental protection law, follow environmental protection policy provisions and identify and promote new solutions for environmental protection-related issues. The role of NFOŚiGW, as an institution co-financing LIFE+ projects, consists in providing financial support of up to 40% (in cases when the beneficiary qualifies for support from the European Commission, it can be 50%) and up to 20% of the project's value (in cases when the

*Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

beneficiary qualifies for support from the European Commission – up to 75%). For years 2007-2010 the European Commission granted Poland financial support amounting to 41 million euro.

Operational Programme Infrastructure and Environment. Since 2007, a procedure of financial support under Priority Axis V of Operational Programme Infrastructure and Environment has been used for programmes related to nature conservation and environmental education. The financed undertakings belong to the following 4 activities:

- support for comprehensive projects related to natural habitat protection in protected areas and maintaining of biological diversity;
- increasing passable condition of ecological corridors;
- developing management plans for protected areas;
- shaping public awareness supporting environmental protection, including biological diversity.

105 million euro is scheduled for spending on the above tasks, 89 million euro of which shall come from the European Union. The project can be co-financed from European Regional Development Fund only up to 85% of the whole project's eligible expenditure. Therefore, a solution has been adopted to allow beneficiaries to complement national contribution with NFOŚiGW funds.

Rural Development Programme: agriculture and environment programs co-financing farms whose owners decided to take certain proenvironmental actions and observe the standards specified in *Rural Development Programme*. The support consists in refunding additional costs or compensating profits lost in result of changing the ways of farming.

Norwegian Financial Mechanism and Financial Mechanism of European Economic Area. The amount Norway, Iceland and Lichtenstein granted Poland for projects carried out from 2004 to 2009 totalled to 533,51 million euro. The role of managing and coordinating institution for the above funds was assumed by Ministry of Regional Development. Out of the six priority areas covered by the financial support, two related directly to environmental protection, namely:

- environmental protection, including human environment, through reducing pollution and promoting renewable sources of energy;
- promotion of sustainable development through better use and management of resources.

Swiss-Polish Cooperation Program. In the first half of 2006 the European Union and Switzerland signed an agreement on the country's participation in financial support for new EU member states. The main objective of the support was to eliminate economic and social gaps between the old and the new members of the Community. Ultimately, the Swiss-Polish Cooperation Program is to support Poland with about 419 million CHF. Part of the amount will be allocated for co-financing projects related to environmental protection, including 10 million CHF for biological diversity and protection of ecosystems as well as support for trans-border environmental initiatives.

### **Environmental impact assessment system**

For a number of years Poland has improved the system for assessing environmental impact of planned and modernized undertakings strictly connected to issuing permits for the undertakings and their further operation. It has also applied to assessing strategies, plans, programs and policies. In this respect more and more often environmental impact forecasts are prepared, that is broader studies that ensure adjusting strategic documents to sustainable development, including issues related to maintaining and sustainable use of biological diversity.

In years 2004-2008 provisions of Environmental Protection Law were in force. It referred to EU regulations, described Environmental Impact Assessment (EIA) procedure, and the manner of defining the subject matter and scope of the assessment. Regulation to the Law clearly stated the components that should be included in the EIA report. Those included also issues related to biological diversity conservation (impact on fauna and flora, landscape, protected nature components, hydrographic conditions, soil, etc.). The Law required all the components to be included in every assessment. However, the degree of detail of the analyses was not specified. Due to numerous problems with interpretation, in 2004 the Ministry of Environment prepared recommendations related to which biological diversity protection aspects were to be included in environmental impact assessments of planned undertakings, strategies, plans, programs, and policies. They were not, however, of obligatory nature but merely comments to the very general statutory provisions.

The need for increasing efficiency of the environmental impact assessment system, especially in case of biological diversity protection issues, and the need of its full adjustment to the European Union requirements were at the base of commencing works on new regulations. In result, on 3 October 2008 Polish Parliament adopted an Act on Sharing Information on Environment and its Protection, Involvement of Society in Nature Conservation, and on Environmental Impact Assessment. It provided foundations for a new administration structure: General Directorate for Environmental Protection and, operating at the regional level, regional directorates for environmental protection, responsible for environmental impact issues and protection of Natura 2000 network in execution of the goals. Therefore, it created a compact system of supervising EIA procedures within one body. It related to supervision of protecting areas valuable in nature terms, especially of Natura 2000 network. Duties of the newly appointed bodies included: cooperation in implementing nature protection policy, control of investment processes, control of responsibilities for environmental damage, collecting data and gathering information about Natura 2000 network and other protected areas, participation in strategic assessments and trans-border assessments, and fostering cooperation with local governments, environmental organizations, other nature and environment protection bodies, the European Commission, and foreign institutions and organizations, in cases related to environmental assessments, investment procedures, and nature protection. Moreover, the act's provisions significantly strengthened the role of public consultations in EIA procedures through, among others, creating better opportunities for ecological organizations to express their views. The modified EIA procedure had an important element: it introduced repeated assessments for undertakings that could considerably impact environment, belonging to a group of largest undertakings with the greatest impact on nature. It applied to those projects that had natural differences in the level of detail of

data between the initial and the final stage of preparing the investment or upgrade project (such as linear investment projects, especially road undertakings).

Implementing the new system for assessing environmental impact of undertakings, plans, strategies, programs and policies ensured considering conservation and sustainable use of biological diversity in the investment and planning processes to a degree much greater than previously applied legal and organizational solutions, so it was an effective tool for managing nature resources.

### **Science**

Growing scientific bases for conservation and sustainable use of biological diversity is a very popular field with Polish science centers. It follows from the fact that the role of scientific research in nature protection is as important as in other areas of social life. Achievements of Polish researchers are well known in such important areas related to environment protection as: botany, zoology, geology and hydrogeology, water management, landscape ecology, environmental law and environmental economics, ecoethics and biotechnology or genetics. Moreover, scientific bases for modern natural environment management are developed. Similarly to other fields of Polish science, research efforts are divided between specific institutions of Polish Academy of Sciences, universities, ministerial research institutes and independent scientific societies, particularly at the regional scale. None of them addresses nature protection comprehensively, so fostering inter-institutional cooperation becomes necessary.

At the turn of the 21<sup>st</sup> century, scientific institutions in Poland gradually addressed issues enabling modern approach to environmental protection and implementation of sustainable development rules into their field of interest. Those issues can be grouped into the following fields:

- natural bases for environment protection and development, clearly focused on studies of biological diversity.
- modern environmental engineering (active and passive systems of restricting threats to the environment);
- environmental risk assessments;
- environment-friendly technologies;
- sciences dealing with nature conservation, law and environment balancing;
- philosophical, ethical, sociological, and psychological aspects of natural environment protection and sustainable development;
- modern measurement techniques and methods in environment protection (GIS, teledetection, precise measurements and studies of the state of environment, theory of environmental databases);
- educational bases on nature protection and sustainable development, methods of teaching and developing environment-friendly attitudes.

It is estimated that in 2008 approximately one fifth of all the Polish scientific institutions conducted studies of theoretical bases, concepts and modes of implementing sustainable



development rules. Research on the structure, dynamics and functioning of plant and animal populations and on natural spatial structures, that is, ecosystems and landscapes, their functions and role in the energy flow, gained particular importance. It is believed that those studies were conducted at a good level recognized both in Poland and internationally, although financial problems grew.

Research of nature protection concentrated in large centers where cooperation with various institutions was feasible. These included the following, in particular: Gdańsk (Tri-City), Katowice (Upper Silesian Industrial District), Kraków, Łódź, Poznań, Warsaw and Wrocław. Smaller but equally active scientific centers included: Białystok, Bydgoszcz, Częstochowa, Lublin, Rzeszów, Szczecin, Toruń. Despite serious financial problems, three sectoral ministerial institutions vested with state tasks continued to operate: the Institute of Environmental Protection, the State Institute of Meteorology and Water Management and Polish Geological Institute. Polish Academy of Sciences faced, particularly in recent years, certain regression due to actual disintegration of the Institute of Ecology in Dziekanów near Warsaw and less activity of research units conducting studies parallel to major universities. On the other hand, the role of Polish Academy of Sciences' Committees dealing with environmental protection and sustainable development grew. Those included, in particular, Man and the Environment Committee, Spatial Economy and Regional Planning Committee, Water Management Committee, Nature Conservation Committee, Geographic Sciences Committee, and, most of all, Ecology Committee. From 2005 to 2008 they focused, among others, on the position of Poland faced with the great contemporary environmental challenges: global warming, future of agriculture, demographics, and renewable energy sources. Several institutions dealing with the state of biological diversity kept holding distinguished positions. Besides the Institute of Meteorology and Water Management and Polish Geological Institute mentioned above they included: Institute of Soils Sciences and Plant Cultivation in Pulawy, National Institute of Hygiene, Institute of Land Reclamation and Grassland Farming, Forest Research Institute, Environmental Protection Institute, and numerous institutes of the Polish Academy of Sciences, including Institute of Botany, Institute of Nature Conservation, Institute of Geography and Spatial Development, Museum and Institute of Zoology, Environmental Research Center, Institute of Geophysics, and other.

Scientific societies, sectoral associations, and parascientific private businesses also play an important role in development of environmental science. Moreover, significant role in fostering the knowledge about environment is played by environmental NGOs which not only conduct their own research projects but also encourage exploring the state of the nature and disseminating current changes, play a special role in development of knowledge of the environment. Scientific, popular science, and educational activities with well prepared methods are also conducted by national parks, some of landscape parks and units of forest promotional complexes. Every year a few hundred scientific and popular science conferences on various aspects of conservation and sustainable use of biological diversity take place in Poland. Many initiatives of the kind are supported with designated financial resources from the National Fund for Environmental Protection and Water Management and are promoted by the Ministry of the Environment.

*Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

The main part of the funding burden is carried by the state budget. Considerable share comes also from non-budget (including the National Fund for Environmental Protection and Water Management) and international institutions (funds from the European Union). Centrally financed objectives include:

- research projects, including those resultant from strategic governmental programs granting funds in contests and assessed by teams of scientists (usually about 10 % of the of funds available each year);
- statutory activities of individual R&D units and Polish Academy of Sciences institutes as well as universities' own projects (about 40-45% of available funds);
- designated projects for preparing implementations, co-financed with institution interested in the implementation (8-19 % of the funding);
- commissioned research projects – important for socio-economic reasons, commissioned by state or governmental administration or self-governmental bodies (0,2-1,6 % of the funds);
- investment projects supporting scientific research or R&D works (10-13%);
- general and technology-supporting activities, including businesses working for science (6-13 %);
- scientific and scientific-technical co-operation with foreign institutions, resulting from international agreements (approximately 2 % of the funding).

Defining its scientific and scientific-technical policy, Poland gives priority to certain scientific disciplines and fields according to their socio-economic significance. Those include projects aimed at improving quality of life, especially through protection of health and natural environment. In result, every fifth research topic directly or indirectly concerns natural environment and sustainable development. Particularly interesting are numerous projects of elementary nature related to biological diversity of selected groups of organisms in Poland (such projects as: “Evolution and biological diversity of insectivorous mammals in Poland (Lipotyphla, Insectivora, Mammalia) compared to the European fauna”, “Biological diversity and biology of rediviva bee (Apoidea: Melittidae) in Poland: threats and conservation”, “Biological diversity and distribution patterns of rare, endangered and threatened fungi in Poland”), to factors impacting diversity (such as: “Dead wood as a relevant factor increasing biological diversity of invertebrates in forest soil ecosystems exemplified by formations of Uropodina mites suborder (Acari: Mesostigmata)”, “Biological diversity of ectomycorrhizal fungi and ectomycorrhizes in mature fir tree stands of various anthropogenic impact level”, “Impact of river valley geomorphology on biological diversity”) and to comprehensive regional studies (such as: “Biological diversity and phytogenic problems of Jura Krakowsko-Częstochowska”, “Hydrological and hydrochemical relations in spatial diversification of vegetation and course of succession processes in peatland ecosystems exemplified by Rospuda Valley”).

*Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

The total expenditure on science in Poland amounts currently to approximately 0,7-0,8 % of GDP. The index is half as low as the average in the EU countries. Expenditure per one researcher in Poland equals just 22 % of the average figure in the European Union.

Despite insufficient funding for science development, the level of Polish scientific staff (in natural sciences in particular) is high. Owing to their good occupational background and valuable results of the work they carry out, the share of global scientific publications signed by Poles is significant – Poland is the 18th country in the world in the respect. Nonetheless, there is a growing crisis in scientific activities, manifested, *inter alia*, by the following:

- a decline in employment in scientific institutions;
- outflow of highly qualified young researchers from domestic scientific institutions in search of job opportunities, first of all abroad, then to non-scientific institutions in Poland;
- widening the generation gap at universities and in R&D centers;
- insufficient amount of modern research equipment in scientific institutions.

The issue of developing research concerning environmental sciences has been addressed in several official governmental strategic and programme documents. The document entitled *Poland 2025. Long Term Strategy for Sustainable Development* (accepted in 2000) points to the necessity of increasing the role of science in the country development by maintaining an active scientific, educational and technological policy, increasing budget expenditure for science, creating a innovative system including research institutes and enterprises and encourage interest of private business in science and its financing. A generally highly rated and still very up-to-date document is the *II National Environmental Policy* (2001). The document points, amongst other issues, at the necessity of tightening dependencies and ties between ecological policy and supporting research and development work in order to ensure the scientific basis of environmental condition assessment, deepening of knowledge of natural processes and more effective prevention of the influence of civilization factors on the natural environment.

Expansion and specification of these guidelines for science has been formulated in the *National Environmental Policy for 2003-2006 including Perspectives for Years 2007-2010* (adopted by the Polish Parliament in 2003) and it's continuation for the next programming period. These documents assume creating a ministerial system of collecting and assessing results of scientific research concerning environmental science and water management and gradually introducing long term research programs concerning Poland's ecological safety, protecting natural heritage, rational use and protection of water resources and protection of forests.

In the *Principles of Scientific, Technical and Innovative Policy of the State by the Year 2020* special emphasis has been laid on some of the new fields within environmental protection science. An important role has been assigned to biotechnology and bioengineering, protection of the natural environment and biological progress in agriculture. Additionally, priority in access to financing has been given to, amongst others, research supporting natural environment protection and increasing innovation and ecological competitiveness of the Polish economy.

Undertaking actions concerning refining mechanisms and instruments used for protection and sustainable use of biodiversity fulfil requirements stated in Articles 6, 11, 14 and 20 of the Convention on Biological Diversity and its Strategic Plan and also meet the 2010 Target and Millennium Development Goals. Despite significant improvement in this field several problems still remain. Special attention should be given to:

- unstable legal system for environmental protection. Insufficient speed of developing and implementing legal acts and administrative acts;
- a lack of unequivocal legal regulations concerning compensation for restrictions on ownership rights on private land being protected in order to maintain biological diversity;
- despite significant improvement there are still ambiguities in division of competences concerning management of regions with a double protection status (e.g. national park and Natura 2000 site);
- a lack of sufficient legal regulations concerning nature protection and safeguarding the functioning of ecological corridors;
- insufficient financing (compared to needs) of actions undertaken for protecting biological diversity;
- a lack of commonly accepted and used methods of assessment and valuation of biological diversity;
- inadequate execution of environmental protection requirements in the space planning system;

### **3.7 Development of international cooperation on a regional and global scale for protection and sustainable use of biological diversity resources**

For several years Poland has actively participated in the work of international organizations and institutions, whose aim is solving global and regional problems concerning environmental protection and stable, sustainable development. One form of these actions is accepting and executing obligations defined in international agreements and conventions. Until now, Poland has ratified 12 multilateral agreements directly involving sustainable development and sustainable use of biological diversity, most of which are of global scope and the rest are regional or sub-regional agreements. Independently of the commitments concerning the Convention on Biological Diversity, Poland has also made commitments adopted from the following conventions and international agreements regulating the rules of protecting chosen components of the natural environment:

- Convention concerning the Protection of the World Cultural and Natural Heritage (Paris Convention), ratified in 1976;
- The Convention on Wetlands of International Importance, especially as Waterfowl habitat (Ramsar Convention), ratified in 1978;

*Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

- Convention on the International Trade in Endangered Species of Wild Flora and Fauna (Washington Convention), ratified in 1989;
- Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention), ratified in 1995;
- The Agreement on the Conservation of Small Cetaceans in the Baltic and North Seas , ratified in 1995;
- The Agreement on the Conservation of Bats in Europe, ratified in 1996;
- The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention). ratified on 1996;
- The Convention on the Protection of the Marine Environment of the Baltic Sea Area, (Helsinki Convention) ratified in 1999;
- The European Landscape Convention, ratified in 2004;
- Cartagena Protocol on Biosafety to the Convention on Biological Diversity, ratified in 2003;
- Aquatic Warbler Protection Agreement, signed in 2004;
- The Framework Convention on the Protection and Sustainable Development of the Carpathians, ratified in 2006;

Two important international agreements, negotiated under the auspices of the Commission on Genetic Resources for Food and Agriculture FAO concerning genetic resources for food (International Treaty on Plant Genetic Resources for Food and Agriculture prepared on the 3<sup>rd</sup> of November 2001 in Rome and ratified by the President of The Republic of Poland on the 15<sup>th</sup> of October 2004) and animal genetic resources (Global Plan of Action for Animal Genetic Resources for Food and Agriculture, adopted through the Interlaken Declaration and accepted by the FAO Conference in November 2007).

Ratification of the above conventions and other international agreements obligates Poland to carry out the included recommendations by appropriately adjusting the Polish legal system and practically implementing agreed protection and averting actions. Independently from the undertaken actions on the national forum, Poland through representatives actively takes part in current work of the bodies of the respective conventions, bringing forward many valuable initiatives. Poland also tries to timely fulfil all formal commitments concerning reporting, financial participation, etc.

The Framework Convention on the Protection and Sustainable Development of the Carpathians is of special importance for developing international cooperation for protection and sustainable development of the Carpathians. The multilateral convention was signed by seven countries: Poland, Ukraine, Romania, Serbia, Slovakia, Hungary and the Czech Republic. It obligates the signatories of the agreement to pursue a comprehensive policy and cooperate for the protection and sustainable development of the Carpathians with a view to improve life quality, strengthening local economies and communities, conservation of natural values and cultural heritage. A

manifestation of this approach was the adoption of a Protocol on Conservation and Sustainable Use of Biological and Landscape Diversity during the second Conference of the Parties of the Carpathian Convention.

An important aim of Polish environmental policy is developing cooperation within the European Union and strengthening of bilateral contacts with neighbouring countries (Ukraine, Belarus, Russia, Lithuania, Germany, Slovakia and the Czech Republic). The Ministry of Environment cooperates with all neighbouring countries within the Intergovernmental Commission for Transborder Cooperation. The Visegrad Group for Environmental Protection works actively, Ministers of Environment from Poland, Czech Republic, Slovakia and Hungary have met regularly since 1990 (once or twice a year) in order to discuss current problems of cooperation between the countries and elaborate common position for international meetings and conferences.

Independently from undertaken actions at the central level, cooperation on the regional scale is also intensively developed. A good example is collective work conducted by Polish, Slovak, and Ukrainian National and Landscape Parks for the Transboundary Biosphere Reserve in the Eastern Carpathians. This cooperation concerns *inter alia* joint development of protection plans and research programs and also development of ecological education of local communities. An important instrument enabling a wide exchange of information and expertise are the annual international conferences on protecting natural resources of the region held in Ustrzyki Górne.

As part of border-zone cooperation working groups for environmental protection and other organizational structures, especially transboundary biosphere reserves and World Natural Heritage sites are active. A substantial development of consultation bodies can be observed as part of Polish-German cooperation, for which an important element is the Polish-German Environmental Council, Polish-German Neighbourhood Council for Environmental Protection, Polish-German Working Group on Nature Protection and the Program Committee of the Lower Oder International Park.

For all transboundary protected areas mechanisms have been created enabling cooperation between management and consulting bodies functioning within these areas. A model example of international cooperation is the joint work of national parks in the Karkonosze and Polesie regions. A new challenge facing Poland is the development of cooperation with developing countries and communicating years of experience in nature protection.

Despite establishing good working contacts with neighbouring countries it is not always possible to solve sporadic disputes (e.g. lack of border zone strict protection areas in Białowieża Forest consistent with Belarussian areas, removing dead and dying spruce trees in the Slovak Tatras, endangering the population of the Three-toed Woodpecker and hunting in Germany geese which are protected in Poland), which are mainly due to different environmental protection traditions in the individual countries and incoherent legislation. Most of these inconsistencies are gradually being eliminated by implementation of EU legislation into national laws.

Undertaken actions concerning international cooperation for protection and sustainable use of biological diversity contribute to fulfilling obligations formulated in Article 5 of the Convention on Biological Diversity, its Strategic Plan and reaching the 2010 Target and Millennium Development Goals.

### **3.8 Sustainable use of biological diversity taking into account fair and equitable sharing of benefits and costs, including costs of abandoning development due to natural resource protection**

The duty of respecting the principles of environmental protection and sustainable use of natural resources has been introduced into many strategic and programme documents, laws and other normative acts concerning functioning of particular sectors of the economy. This in particular regards forestry, agriculture and aquaculture directly using natural resources. Abiding by the law by individual economic units is controlled by the Inspectorate of Environmental Protection and other state control organs as well as government and local government administration.

In forestry the system of regulations of exploitation of natural resources is especially developed. Independently from the obligation of respecting the law, any actions undertaken on the forest inspectorate level, including acquisition of resources have to comply with the accepted forest management plan. A specific example of state control over forestry is the requirement defined in the forestry law stating that the Council of Ministers has to present to parliament a report on the execution of this law containing information on the state of forests and execution of the national plan of increasing forest coverage. As far as agriculture is concerned a system of pro-ecological orientation of natural resource usage has not yet been fully devised and implemented. Agro-environmental schemes implemented for the last four years are the beginning of a system of voluntary economical incentives promoting agricultural economy oriented at sustainability and biodiversity. An important part of it is the currently implemented system of sites of the NATURA 2000 network.

A wider presentation of the issues of sustainable use of biological diversity in chosen sectors of the economy has been presented in part 3 of this report.

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Undertaken actions concerning sustainable use of biological diversity contribute to fulfilling obligations formulated in Article 10 of the Convention on Biological Diversity, the Strategic Plan of the Convention as well as reaching the 2010 Target and Millennium Development Goals..

## **4. SECTORAL AND CROSS-SECTORAL INTEGRATION OR MAINSTREAMING OF BIODIVERSITY CONSIDERATIONS**

### **4.1 Forest management**

In the foreseeable future, Poland will not be among countries at risk of deforestation, threatening its sustainable development. The above is guaranteed by the forest policy adopted by the state, along with the practice of ecologization of the forest economy, carried out by the State Forests National Forest Holding (Państwowe Gospodarstwo Leśne Lasy Państwowe – PGL LP). This business entity manages 78% of forests in Poland. Forests in national parks and forests owned by local authorities and the State Treasury amount to 4% of the total forest area. The remaining 17% are private forests. The dominant role of the state in the forest ownership is peculiar to Poland and generally uncommon across the European Union. On the one hand, the dominant role of the state facilitates sustainable forest management, whereas on the other hand, PGL LP is at risk of becoming privatized and market-oriented in the modern market economy. Despite the threat, the leading role of the state in forest management is not only successfully maintained, but also deepened. Maintaining the present status of Polish forests (e.g. their general accessibility) is essential for sustainable forest management that guarantees harmonious relationship between the growing demand for materials and the need of preserving forests for their environmental significance.

The Forest Act of 1991 specifies the principles of preserving, protecting and expanding forest resources, along with principles of forest management, in connection with other components of the environment and national economy, regardless of forest ownership. These principles equalize environmental and social benefits with resource-related benefits. The legal basis for the protection of forest species is contained in the Act on Protection of Farmland and Forestland of 1995. Two years later, the government outlined the *National Forest Policy*, related to the provisions of the *National Environmental Policy* of 1991, updated by the Polish Parliament in 2001 as the *II National Ecological Policy*. As a result of introducing the *National Forest Policy*, the *Polish Policy of Sustainable Forest Management* was adopted by the Chief Executive of PGL LP. Pursuant to the *National Forest Policy*, the sustainability and multi-functionality of forests shall be maintained through: increasing forest resources of the country, improving the condition of forest resources and their continual protection, as well as changing the mode of forest management from raw material-oriented model to pro-ecological and economically sustainable, multifunctional forest management model.

In 2007 (as of 31<sup>st</sup> December), the forest area of the country was 9,05 million ha., constituting 28,9% of the total area of the country. The ownership structure is dominated by public forests – 82,1%, of which 78,1% is managed by PGL LP. The percentage of private forests varies geographically, with the highest proportion found in southern, central and eastern provinces of Poland: Małopolskie (43,3% of the total forest area of the province), Mazowieckie (42,8%) and Lubelskie (39,5%). The lowest proportion of private forests is observed in western provinces of Poland: Lubuskie (1,2%), Zachodniopomorskie (1,5%) and Dolnośląskie (2,5%), mainly for historical reasons. Forests in Poland cover areas of the poorest soil, this fact being reflected by the arrangement of habitat types: the prevailing temperate coniferous forests make up 55,1% of



forests managed by PGL LP. Coniferous species cover 76,7% of the area. In Poland, pine (69,3% of the area together with larch) has the most favourable climatic and biotopic conditions in its Euro-Asian occurrence area. Between 1945 and 2007, the species composition structure of forests in Poland changed significantly, this fact being reflected by the increasing percentage of deciduous forests under the management of PGL LP from 13% to 24%. The age structure of forests managed by PGL LP is dominated by age class III and IV (approximately 44% of the area altogether), with age class II and III for private forests (60% of the area). In PGL LP, trees older than 100 years cover 14% of the area, with 2% for private forests. Over 51% of trees in PGL LP are 41-80 years old (age class III and IV). In private forests, over 2/3 of trees are of age class II and III. The volume of trees older than 100 years in PGL LP amounts to 18% of total volume. The average age of forest stands in PGL LP (in 2007) was 60 years, with 40 years for private forests.

Forests are a renewable source of wood materials that enhance development, without harm to the environment. In the recent years, forest resources have been used at a rate that is below the self-recovery capability of the natural environment in order to ensure forest sustainability and increase wood resources. Wood resources of the country are growing. The growth is reflected by an increase of gross wood volume up to 1,91 billion m<sup>3</sup>. For the past twenty years, forest resources in PGL LP have been used at a rate that is below the volume growth rate. In 2006, the harvested volume made up 56% of the growth. A more dynamic economic development since Poland joined the EU has resulted in a growing demand for wood. In the years 2005-2008, a more intense pressure from different industries for increased production of wood has been exerted and it may remain so in the years to come.

Forest ecosystems are the most precious and the most abundant component of environmental protection areas that cover over 32% of Poland's area. Forests make up almost a half (43,5%) of the protected area. The majority of the country's most valuable and the most attractive environmental protection areas are managed by PGL LP. Pursuant to the Forest Act and the *National Forest Policy*, for the past several years, PGL LP has been drawing up an inventory of all precious forms of biological diversity, updating it when creating environmental protection programmes for forest divisions. The inventory contains all the components protected by law, i.e. nature reserves, nature monuments, ecological sites, endangered and rare species. PGL LP takes its own initiatives to maintain the biological diversity and restore endangered species of flora and fauna. These initiatives include: *Forest Gene Preservation Programme*, *Programme for restitution of Fir in Western Sudeten Mountains*, *Yew Restitution Programme* and *Capercaillie Reintroduction Programme*. Over 243 000 ha of forest stands provide seeds for the propagation of indigenous ecotypes of tree species. A significant part of the approved protection areas in Poland within the European network of Natura 2000 are located on woodlands. Those areas in PGL LP amount to 2,6 million ha. They include a significant part of large forest complexes, such as Bory Tucholskie, Puszcza Augustowska, Puszcza Piska and Puszcza Białowieska. Since 2006, PGL LP has been running a project aimed at increasing retention capabilities and preventing floods in forest ecosystems located in lowlands. The project has a chance of becoming the first European large-scale undertaking aimed at increasing retention capabilities of forests. The main objective of the project is to improve the water balance in small river basins, minimise the effects of droughts in forest ecosystems and prevent floods. The undertaking is also aimed at preserving the biological

diversity of water terrains and swamps, as well as restoring swamps and marshes to their natural state.

*Forest Promotional Complexes* (FPC) are of primary focus when it comes to enhancing the management model that integrates the objectives of environmental protection, improving the biotope-forming function of forests, providing the sustained use of wood resources, ensuring the economic stability of forestry and collectivizing the management of forests as a public property. These complexes have been created as a result of implementing the *National Forest Resources Protection Policy*. FPCs facilitate intercommunication between the community and forest officers. PGL LP runs an educational programme aimed at promoting the idea of pro-ecological and multifunctional forest management, especially among children and young people. The programme is implemented by all PGL LP forest divisions, most of its regional head offices and its national units (Information Centre, Forest Culture Centre in Goluchów, Forest Gene Bank in Kostrzyca or Centre for Development and Implementation of State Forests in Bedoń). With their education facilities, Forest Promotional Complexes play the key role in providing forest education for the local community. Equally important objectives include: forming ecological awareness and appropriate attitudes towards forests and forestry, along with developing multilateral and rational cooperation with environmental organizations and associations. PGL LP's policy of promoting ecological forest maintenance has led to creating 19 FPCs with the total area of 990 500 ha, with this being almost 13% of the total area under the management of PGL LP.

Since 1989, forests in Poland have been assessed for damage every year within the forest monitoring programme that is part of the State Environmental Monitoring System. Health condition of forests is affected chiefly by weather conditions, soil quality and air pollution. Weather conditions in 2007 were favourable for the formation of assimilation apparatus in trees. The average rainfall in the vegetation period for the country reached the highest level in the quinquennium (113% of the perennial average). The increase in rainfall in the vegetation period in 2007 was accompanied by a decrease in the number of damaged trees in most regions. The health condition of trees is endangered by the process of eutrophication of forest biotopes. Observed in most areas of the country high concentration of nitrogen compounds results in a higher susceptibility of trees to negative effects from biotic and abiotic factors. This phenomenon is confirmed by the increased content of nitrogen in the assimilation apparatus of all species studied in 1997-2005. The process enhances the growth of trees but it also makes trees more susceptible to pathogenic fungi, insects, as well as frost and collapse under wind or snow. Prevailing in most regions of the country high level of NO<sub>2</sub> aids the process of eutrophication of forest ecosystems. An opposite trend is being observed for SO<sub>2</sub> concentrations that remain at the same level or decrease. The health condition of trees has remained unchanged in recent years. The past two years have shown a slight improvement in health condition of pine, fir, beech, alder and birch trees. Deterioration of health condition has been observed in spruce trees, especially in southern Poland, and oak trees that have shown signs of poorer health condition throughout the country for the past several years. The poor health condition of spruce trees has remained a problem. The spatial distribution of health condition of trees is highly uniform. In comparative data from 2007, listing European countries according to the proportion of trees falling under defoliation classes 2-4, Poland was identified as a country with an average proportion. In Poland,

these proportions were as follows: 20,2% for all species studied, 20,9% for coniferous species and 18,9% for deciduous species.

There are serious concerns as to the protection, management and exploitation of private forests. They are dispersed, often mismanaged and neglected. It is essential to provide sufficient funds to ensure proper supervision over forest management in private forests. They cover an area of 1,6 million ha., i.e. 17,9% of the total forest area in Poland. It has been estimated that the actual area may be even larger by 300 000-400 000 ha, since many plots have not been converted from farmland to forest land. These forests are of lower environmental and economic value when compared to state forests (with few exceptions, e.g. in Carpathians). This poor condition is mainly due to dispersion. The average size of a forest property in a farm is approx. 1,43 ha. The *National Forest Policy* stipulates that in order to improve the condition of private forests, small forest owners should form associations. Collective administration could make the management of private forests more rational. Since its accession to the EU, Poland has missed some opportunities for obtaining European funds for private forests within the framework of *the Rural Development Programme*.

Currently, the basis for afforestation in Poland is the *National Programme for the Augmentation of Forest Cover* (NPAFC), created by the Forest Research Institute, approved by the government in 1995 and updated in 2003. As a result of the modification, the programme has provided for an increase of the formerly accepted afforestation area to 680 000 ha in the years 2001-2020, and has led to a verification of the existing afforestation preferences across the country. Pursuant to the *National Forest Policy*, the main objective of the NPAFC is to increase the country's afforestation to 30% in 2020 and to 33% in 2050 and to provide optimum spatial and temporal afforestation distribution, along with establishing ecological and economic preferences together with completion measures. For the past 13 years, over 200 000 lands of different ownership status have been afforested in the framework of the NPAFC. As for afforestation volumes, the programme objectives have been divided into stages. In the first stage (1995-2000), a total of 111 300 ha of land was afforested, meaning that 111% accomplishment was achieved. The second stage (2001-2005) provided for afforesting 120 000 ha of land. Actually, only 95 400 ha of land was afforested, giving 79,5% accomplishment.

In 2004, a farmland afforestation support system was introduced within the framework of the *Rural Development Plan* (RDP), giving an important incentive for afforestation. With the financial support from the European Union, tens of thousands of hectares of farmland were afforested in the years 2006-2008. Afforestation courses for land owners have also for the years 2004-2006 been introduced at a large scale. All RDP activities are financed in 80% from EU grants and in 20% from own resources. The afforestation plan is based on a scheme prepared by a forestry inspector, i.e. the local PGL LP representative, who is a guarantee of its credibility. Subsidies received do not only provide resources for planting trees, but also for their maintenance for 5 years to follow, along with an afforestation premium to compensate for the loss of income as a result of converting a farmland into a forest land.

However, a large number of premises indicate that the subsequent stages of RDP will not be completed. It is anticipated that the limitations introduced to the *Rural Development Programme for the years 2007-2013* (exclusion of meadows and pastures, as well as Natura 2000 sites, from

#### *Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

afforestation, limitation of afforestation volume per 1 beneficiary from 0,5 to 20 ha, considerable acreage reduction for farmlands obtained by PGL LP from Agricultural Property Agency for afforestation, along with an increase in farmland prices) will make the RDP objectives impossible to achieve in the subsequent stages.

In the years 2000-2004, Polish environmental policy was in line with the process of joining the European Union. Forestry law had been adapted to the European legislation before Poland joined the European Union, and in the years 2000-2004, activities were focused on carrying out the accepted programmes, international cooperation and enhancing the significance of forestry for regional development, pursuant to the guidelines of the *EU Forestry Strategy*. In the years 2004-2007, Poland presided over the *Ministerial Conference on the Protection of Forests in Europe* and hosted the 5<sup>th</sup> ministerial conference. MCPFE is an initiative of cooperation at a high political level in order to ensure the possibility of taking collective actions for forest protection and maintaining sustainable forest management in Europe. The conference involves 46 European countries and the European Community. Furthermore, the conference is watched by international government and non-government institutions and organizations and non-European countries. With the implementation of the EU law in 2004, a Bureau of Forest Seed Production was created and the *National Register of Forest Base Material* was introduced for the territory of Poland. Unique for Europe, a mycorrhized seedling production is widely being practiced. In the past 4 years, 200 million seedlings of trees and shrubs have been planted. Within the *Forest Gene Preservation Programme and the Cultivating of the Selective Forest Tree Species in Poland*, activities are taken aimed at protecting endangered and rare species, including yew and wild service tree. Within the *Progeny Testing Programme*, the first test cultures of beech were created. In the years 2005-2007, within the EU programme *Food Sector Restructuring and Modernisation of Food Sector and Rural Development*, actions were taken in order to restore forest production potential that had been damaged through a natural disaster or fire. Owners and administrators of forests damaged as a result of natural disasters or fire may claim support from the European Union for restoring the forests. In 2005, the first edition of *Plant Your Tree* competition was launched. It is aimed at promoting afforestation, mainly in rural areas and small towns.

At present, Poland is committed to carrying out the provisions of the *National Environmental Policy for 2003-2006 including Perspectives for Years 2007- 2010*, adopted by the Parliament. The forest management policy carried out in Poland is also consistent with worldwide forestry trends, as described in *Forestry Rules* (UNCED 1992). All forest owners are obliged to promote sustainable forest management, as described in the Forest Act (1991). PGL LP's forest policy is based on the principles of general forest protection, long-term maintenance, continual and sustainable use of all forest functions and afforestation. The above statement is supported by the *Good Forest Management Certificate* that was awarded to most forests under PGL LP management. The certificate is awarded by certification organizations, acting according to the standards of Forest Stewardship Council and SmartWood (e.g. Societe Generale de Surveillance, Nepcon). The certificate bears on the fact that forests in PGL LP are managed in a way that makes it possible for them to continually fulfil their productive, environmental and social function. The certificate is also a guarantee for customers that wood they purchase is manufactured in an environmentally friendly way, according to up-to-date requirements of the sustainable development.

## **4.2 Agriculture**

When compared to other European countries, Polish agriculture and rural area development are of great social and economic significance, although, the share of agriculture in GDP is substantially low (2,6%). Over 38% of Polish population lives in rural areas. There are regions where farming is the main industry, affecting the quality and standard of living. Polish agriculture has preserved its traditional model, with many regions still using multidirectional extensive farming methods. This is largely due to the natural environment as well as historical and cultural factors. Agriculture in Poland has a great potential despite the fact that climatic and soil conditions here are less favourable than in most European countries. In 2008, 16,3 million ha of land was used as farmland, i.e. 52,2% of the total area of the country. Polish agriculture is distinguishable by high dispersion, large labour force, medium and poor quality soil, relatively low use of industrial means of production. The rural population in Poland is not as well educated as in other EU countries. Nevertheless, Poland is a recognized producer of a number of farming, gardening and animal products.

It is a serious and pressing problem to adapt Polish farms to the EU standards for environmental protection, as well as hygiene and wellbeing of animals. According to sociological research, these areas lag behind as a result of poor economic conditions, along with the lack of proper education and vocational training. Only some 30% of farmers are aware of potential negative effects that farming may have on the environment. It is especially costly to modernize production facilities, provide new technical equipment, proper sanitary conditions in dairy production, meat production, vegetable and fruit processing, etc. The present mineral fertilization level (approx. 93 kg of NPK) and the use of chemical plant protection products in Poland are regarded as moderate. Such use of chemicals does not have any negative effects on the quality of arable lands and products. From this point of view, this model of production is environmentally friendly. New challenges related to environmental care are described in *Code of Good Farming Practice* that specifies environmentally-friendly methods of farming.

Poland owes its rich biodiversity to favourable natural conditions, as well as different anthropogenic influences (uneven industrialization and urbanization, traditionally extensive farming, large and durable forests preserved in many areas) when compared to other European countries. As a result of maintaining the traditional, extensive methods of farming, certain local varieties of plants and animals have been preserved.

Poland is capable of producing quality food, demand for which will grow both among the EU and Polish consumers. Environmental advantages of rural areas, together with large labour force, create excellent conditions for ecological farming. For a long time, ecological farms that pursue the idea of environmental protection have been marginally represented (0,03% of the total farmland area). The number of ecological farms began to soar in 1999, with the introduction of subsidies and legal measures (the first act on ecological farming passed by the Parliament in 2001), especially the new act on ecological farming as of 2004. The act regulates, among other things, the conditions for farming production and food processing with the use of ecological methods, and specifies the system of control and certification, along with requirements for ecological product circulation and marking. In 2005, a total of 7 128 farms were registered in the

ecological farming control and certification system, with 11 887 farms (certified and still in the process of shifting production) registered in 2007.

The protection of biodiversity and its sustainable use is ensured by introducing agro-environmental schemes. They are based on the *Rural Development Programme*. They were introduced in the previous programming period (2004-2006) and are being implemented in this programming period (2007-2013). The main objective of agro-environmental schemes is to achieve sustainable development in rural areas and to preserve biodiversity in these areas through promoting farming production that is using methods based on environmental protection principles. Agro-environmental schemes are used to subsidize farms that are run ecologically and meet the *Rural Development Programme* standards. The subsidies are also intended to reimburse costs or compensate for financial losses incurred as a result of converting the production model. The activities that are supported have been expressed in the following nine so-called agro-environmental packages:

- Package 1. Sustainable agriculture;
- Package 2. Ecological agriculture;
- Package 3. Extensive permanent grasslands;
- Package 4. Protection of endangered bird species and habitats outside Natura 2000;
- Package 5. Protection of endangered bird species and habitats within Natura 2000;
- Package 5. Protection of local varieties of cultivated plants;
- Package 7. Protection of local breeds of household animals;
- Package 8. Protection of soil and water;;
- Package 9. Buffer zones.

Subsidies from agro-environmental packages are granted to actions aimed at preserving biological diversity both in protected areas and beyond such areas. Additionally, such actions are to reduce hazardous pollutants disposed into the environment and to limit their effects by creating buffer zones. Thus, the formally approved and practically implemented idea of agro-environmental schemes provides a substantially broad approach to issues related to environmental protection and biological diversity in agriculture and with the introduction of the minimum participation period of 5 years and the involvement of whole farms only, the programmes may bring long-term results. Farmers show great interest in agro-environmental schemes, with this fact being reflected by a number of 600 000 applications filed for participation in the programme in the previous programming period and a constantly growing number of ecological farms in Poland. In the years 2004-2007, their number increased approximately 5 times. The number of ecological processing plants doubled in the same period (207 in 2007).

Another instrument used to improve biological diversity in rural areas is the so-called single payment. It is introduced gradually and intended to replace the so-called direct payments. Obtaining the single payment requires, among other things, meeting several ecological criteria. The first criterion was introduced in early 2009 and it requires the farmland to be maintained in

the so-called *Good Farming Conditions*, according to environmental protection requirements. In particular, these requirements include:

- wild bird protection,
- groundwater protection from contamination with dangerous substances,
- conditions of using sludge in farming,
- water protection from nitrates of agricultural origin,
- wild fauna and flora protection.

Among initiatives that improve the ecology of Polish agriculture one deserves particular attention for its innovative character: IRENE project that is based on the postulations of the *Strategy of Multifunctional Development of Rural Areas*. Its key objective is to create conditions for development in rural areas as based on ecological farming through development and implementing a new model of cooperation between partners that are interested in such activity. Possible solutions are to be implemented in test areas, including Brodnicki Park Krajobrazowy (Brodnica Landscape Park) where the so-called Ecological and Multifunctional Agriculture Competence Centre is located. Furthermore, the project has led to organizing information and training events that promote the idea and methods of producing healthy food.

The most important of all documents that had formed the basis of agricultural policy during the four years before Poland joined the European Union was the *Coherent Structural Policy for Rural Areas and Agriculture Development* (1999). It specifies the following objectives of the rural area sustainable development policy.

- creating conditions for the sustainable development in rural areas, protecting environmental resources together with the rural cultural heritage (including the promotion of ecological farming and other pro-ecological methods of agricultural production, along with bringing marginal lands into cultivation);
- shaping working and living conditions for rural communities according to contemporary living standards so that people living in such communities can achieve their goals;
- reorganizing the agriculture in order to create conditions for adapting it to the changing economic and social situation.

Today, such policy forms the basis for formulating further development strategies for Polish agriculture and rural areas, as well as for dealing with the present financial period in the European Union in the years 2007-2013. The above shows determination with which Poland has been making efforts since early 1990s to continue the process of modernizing its agriculture, without detriment to its cultural heritage and environmental advantages. These are the attributes that will make Polish agriculture and products stand out in the competitive market economy of the European Union.

Along with the development of the principles of reorganization and strategic documentation for rural areas in Poland, worked-out by the Ministry of Agriculture and Rural Development, the issues related to this sector of the economy and its impact on the environment have been

addressed throughout the whole revision process of the environmental law in Poland. This process became a part of the general process of adjusting Polish law to the EU legislation. The objectives of the sustainable development for the country, applicable also to agriculture, were expressed in the *II National Environmental Policy* (2001) and *National Environmental Policy for Years 2003-2006 including Perspectives for Years 2007-2010* (2003). The use of good management practices and environment management systems has been deemed a priority in order to be able to merge ecological benefits with the economic ones. It was also accepted that protecting biological and landscape diversity in rural areas plays the key role in ensuring ecological security of the country.

Poland's accession to the European Union had a great impact on setting out strategic goals. The main programming document was the *National Development Plan 2004-2006* that defined the development strategy for the social and economic development of Poland in the first years after joining the European Union. This document formed the basis for the development of the *Sectoral Operational Programme – Restructuring and Modernisation of Food Sector and Rural Development*. The *Rural Development Plan* for the years 2004-2006 was also created and it formed the basis for farming subsidies from the Common Agricultural Policy fund.

In 2007, a new document was launched: *National Strategic Reference Framework (National Cohesive Strategy) for the Years 2007-2013*. It ascribed the key role to agriculture and rural areas. The *NDP (2007-2013)* with its 16 regional programmes provides for support for rural areas from the European Regional Development Fund and the European Social Fund. The *Rural Development Programme for the Years 2007-2013* was among the first programmes and it was launched in September 2007. It was financed from the European Agricultural Fund for Rural Development and based on experience gained from the *Rural Development Plan for the Years 2004-2006* and *Sectoral Operational Programme – Restructuring and Modernization of Food Sector and Rural Development for the Years 2004-2006*. The activities to be undertaken include: support for farms in mountain areas and other less favoured areas, along with afforestation of farmlands and other types of land. The budget of the programme amounts to 17 billion euros.

*The Rural Development Programme* was preceded by the *Rural and Agriculture Development Strategy for the Years 2007-2013* (with a forecast up till 2020). The document assumes that in 2007-2013 Poland will follow the model of multifunctional rural development. The process of sustainable development in rural areas will be supported through diversifying activities in order to provide alternative sources of income, adjusting farming production to the environmental requirements and without detriment to the landscape. It will also be important to improve the social and technical infrastructure in rural areas. Selected food processing industry branches will be strengthened and support will be provided for plant modernization investments, in particular those that will be aimed at meeting environmental standards and requirements. Support will also be provided for activities aimed at marketing and promoting farming products. Also, supporting traditional and regional products will be another priority.



### **4.3 Fishery**

Poland's geographical location and its environmental specificity are the main factors that explain why its fisheries concentrate around the Baltic region and inland waters. Additionally, very important are fish cultures.

The main species fished in the Baltic Sea include: cod, salmon, herring, sprat, flounder and bull trout. In 2006, Poland fished 104 900 tons, i.e. 19 400 tons less than in 2005 (124 300 tons) and 48 900 tons less than in 2004 (153 800 tons).

For Polish fishermen cod is the most precious species from the economic point of view. Its catch in 2006 amounted to 15 000 tones, i.e. 3 000 tons more than in 2005. Nevertheless, due to overfishing in most fishing grounds, no increase in fishing quotas nor improvement in the biomass of the species can be expected in the years to come. With the introduction of small catch limits, some fishermen have been forced to shift to fishing flounder. For the past several years, sprat catches have tended to decrease. In 2006, they amounted to 56 200 tons, with 74 300 tons in 2005 and 96 700 tons in 2004. This drop resulted from the withdrawal of a part of the pelagic fleet, along with low prices offered by fodder manufacturers. In comparison with the previous years, herring catch has also decreased. In 2006, the catch amounted to 20 600 tons, with 21 800 tons in 2005 and 28 400 tons in 2004. Another catch drop has been observed for bull trout (180 000 fish in 2004, 142 000 fish in 2005 and 128 000 fish in 2006). The only species that has been providing unchanged catch volume since 2005 is salmon (approx. 20 000 fish a year).

With a substantial overexploitation of the fish resources, catch limits have been introduced for individual species. For the past several years, they have been used as follows:

- sprat: 2003 – 104,9%, 2004 – 81,7%, 2005 – 52,6%, 2006 – 48,6%;
- herring: 2003 – 105,0%, 2004 – 88,3%, 2005 – 64,5%, 2006 – 57,1%;
- cod: 2003 – 100,7%, 2004 – 103,6%, 2005 – 97,6%, 2006 – 99,9%;
- salmon: 2003 – 83,0%, 2004 – 88,1%, 2005 – 77,4%, 2006 – 70,5%.

With the introduction of catch limits, some fishermen have been forced to shift their business to tourist services and sea angling.

The area of inland waters (natural and artificial) in Poland amounts to approximately 600 000 ha: approx. 300 000 ha of lakes, 139 000 ha of rivers and streams, 55 000 ha of dam reservoirs (larger than 20 ha), 40 000 ha of marshes and old-river beds. For the past several years, the share of inland fisheries in overall food production has dropped, although this type of business has had a growing impact on the rationality of water resource management in order to protect the biological diversity, preserve fish resources for future generations. The scope of activities has also been diversified, mainly due to a growing interest in tourism and angling. In Polish legislation, entities entitled to be involved in fishing are obliged to ensure rational fishing management in surface waters. The management should allow for the maintenance of fish resources in biological balance and at a level that will enable future generations to use them effectively. In 2006, approximately 2 870 tons of fish were obtained commercially from surface waters, and 2006 was another year of reduced catch volume in by fishermen. The average commercial catch volume in

fisheries is decreasing every year. In the case of inland fishing, recreational fishing is becoming increasingly popular. It has been estimated that in 2006, a total 15 000 tons of fish was obtained as a result of angling. In Poland, almost 1 500 000 people engage in sport fishing. The rules of recreational fishing are regulated by the Act of 18 April 1985 on Inland Fishing. Pursuant to this act, fishing territories are organized in fishing districts. Strategic for these districts are documents known as fishing management plans. They are drawn-up for a period of 10 years and apart from the principles of rational fishery management, they specify the rules of recreational fishing. They establish protection periods, areas and sizes for individual species, permitted methods of fishing and the allowed number of specimens of each species to be fished by an individual angler. Owing to these regulations, it is possible to maintain ecological balance in water ecosystems, maintaining a pre-defined population of the most precious species. Of great importance is also the fact that any individual interested in pursuing recreational fishing is obliged to obtain the so-called fishing licence. To receive one, it is necessary to become familiar with legal regulations and the basics of water ecology. This requirement helps to build better environmental awareness among anglers. There are several institutions that ensure the observance of the regulations contained in the Act on Inland Fishery, regulations of fishing districts, and verify the possession of relevant permits. These institutions include: National Fishing Guard, Public Fishing Guard of the Polish Fishing Association, Police, Property Protection Guard of the Polish Fishing Association, National Hunting Guard and guard services from national parks and landscape parks. Apart from issuing fishing permits, fishing districts and the Polish Fishing Association are responsible for stocking. Stocking is aimed at maintaining and improving the ecological condition of water ecosystems. It is scheduled in fishing management plans. Waters are stocked mainly with native species that are adequate for a given habitat. To be able to introduce species that do not occur in Poland, it is necessary to obtain a permit from the ministry of agriculture, issued in consultation with the ministry of the environment upon the opinion from the State Council for Nature Conservation. Thus, the introduction of new species is strictly controlled. It should be emphasized that stocking is scheduled based on research results, under the supervision of ichthyology specialists. The process is constantly monitored and evaluated. This is possible through marking of the fry and collecting information from anglers on occurrence areas and condition of individual specimens. With the activity of fishing districts and the Polish Fishing Association, angling is becoming increasingly sustainable, focusing not only on using the existing resources, but also on maintaining them in good condition.

Poland is engaged in nursery-based culture of fresh-water species. With regard to fish species and breeding methods, two types of activity can be distinguished: nursery-based culture of fresh-, warm-water fish and fresh-, cold-water fish. Out of 70 000 ha of estimated nursery area, only some 50 000 ha is in use (70%). It is estimated that there are approximately 600 fish farms that offer their products for sale. Among these, approx. 400 farms have fish nurseries of more than 50 ha in total area. Most of them specialize in carp production based on in-ground nurseries that use natural resources. Such production is of extensive type. In-ground carp nurseries are an important and precious element of the traditional rural landscape and national biodiversity protection systems. In Poland, in-ground fish nurseries have an additional function: they retain surface waters and provide habitats for legally protected plants and animals. In fact, in some parts of the country, Natura 2000 sites were pointed out by locating large areas of in-ground carp

nurseries that provided habitation for numerous rare and precious plants and animals. The other type of fish breeding is focused on fresh-, cold-water species, primarily rainbow trout. A vast majority of trout farms are located in northern and southern regions of Poland, in areas abundant in clean and cool rivers and streams. Salmonoid fish cultures use intensive breeding methods, based on new-generation granulated fodder and equipment to improve the breeding conditions in concrete nurseries. Fish cultures of species other than carp and rainbow trout are estimated to provide the production of 2 000 tons annually. Sturgeon, African catfish and native crayfish cultures are becoming increasingly popular.

More and more farms undertake tourist services, taking advantage of attractive locations of their nurseries, availability of fish, rich flora and fauna in the vicinity of their nurseries and a growing demand for recreational fishing and leisure activities in areas of high natural values.

The basic documents that determine the direction of fishery development are as follows: The *Fisheries Development Strategy 2000-2006* with its continuation and extension described in the *Fisheries Development Strategy 2007-2013*. The above documents define the key objectives, including:

- obtaining and maintaining a durable balance between resources and fishing capacities, providing social and economic protection for employees in the fishing industry and undertaking actions aimed at improving the competitiveness of fisheries in close connection with the condition of available resources;
- providing conditions for the sustainable development in inland aquacultures and fisheries, an increase in fresh-water fish production, an improvement in the profitability of fish cultures, an improvement in the competitiveness of aquaculture products and stabilization of employment in the industry, along with the continuation of the development by improving standards and ensuring employment stability in the fish processing industry;
- providing support for activities aimed at building stationary and movable facilities intended for protection and development of water flora and fauna or restoring inland and sea waters, including sprawling areas and migration routes of migrating species (e.g. creating fish passages and artificial reefs);
- providing support for activities aimed at preserving biodiversity and restitution of precious and protected species.

The above objectives are coherent with the basic principles of the *Common Fishery Policy* of the European Union and national programming documents and relevant legal instruments. They are being carried out with the help of the European Fisheries Fund and state subsidies.

The basis for carrying out the *National Strategy for Fisheries Development for 2007-2013* and, consequently, the means of providing support for Polish fisheries sector in the years 2007-2013 as per the Operational Programme of *Sustainable Development of the Fisheries Sector and Coastal Fishing Areas 2007-2013*, is the *Framework of the Sustainable Development of Polish Fisheries Sector*. It provides for a support for the common fisheries policy in order to optimize the production potential of living sea resources so that they can be used by future generations, with simultaneous support for actions aimed at providing a durable balance between resources and catch capacity of the national fleet. The framework was created as a result of an obligation, undertaken by Poland and other

member states of the Community at Johannesburg Sustainable Development Summit (September 2002), to maintain or recover resources so as to ensure the highest maintainable catch, with the simultaneous maintenance of the resource balance in seas. It is also essential to provide support for aquaculture in order to ensure economic, environmental and social continuity, support for the sustainable development of inland fisheries and support for activities aimed at protecting and improving the condition of the environment and natural resources in the fisheries sector.

#### **4.4 Tourism**

Interactions between tourism and natural environment are characterized by feedback. On the one hand, tourism, being the recipient of natural environment, makes use of its resources. These resources are often the essence of the tourism product, at the same time delineating its attractiveness and value. On the other hand, however, tourism, apart from other fields of business activity, can lead to environmental degradation and destabilize the functions of its resources and, at the same time, disturb their use in the process of creating and offering the tourism product. It is estimated that in Poland tourism contributes to degradation of natural environment by 5-7%, while industry - by 60% and agriculture - by 15%. The threat posed by tourism is growing in the most popular tourist destinations, in regions where the number of people coming to have a rest is very high, in situations when the stipulated limits of permitted tourist traffic are not respected. The areas that are especially threatened by this type of degradation include Baltic Sea Coast, Masurian Lake District, the Tatra Mountains and the Karkonosze Mountains.

From the socio-economic point of view, positive sides of tourism development includes also advantages, arising mainly from stimulating the resourcefulness of city-dwellers for receptive areas, which benefit from a range of services provided for tourists.

In the past few years the interest of nature-oriented tourism has visibly been gaining ground in Poland. This happens due to the fact that natural richness of national and landscape parks is presented in an even more attractive form, mainly because these parks develop tourism infrastructure, as much as they can, by erecting museums and natural exhibits, didactical paths, nature-oriented routes and information spots. Among the different types of professional tourism there is one type growing particularly fast, namely leisure activities combined with ornithological observations in national parks, mainly in Biebrza National Park and the Ujście Warty National Park.

Apart from nature-oriented tourism, developing mainly on protected areas, there are other environment-friendly tourism alternatives, so-called ecotourism and agrotourism. In the past few years a dynamic expansion of the above mentioned tourism alternatives could be observed. The number of agrotouristic holdings increased from 590 in 1990, 4800 in 1997, to almost 8000 today. The biggest number of agrotouristic accommodation places can be found in the Malopolskie Voivodeship (1220) and in the Podkarpackie Voivodeship (1060). The foundation of numerous organizations and associations to promote ecological tourism is another tangible effect that this kind of tourism is developing in Poland. Most active ones include:

*Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

- The Polish Chamber of Agrotourism – founded in 2003; it is a voluntary association of businesses providing services in agrotourism, farmers and entrepreneurs conducting processing operations or pursuing a business activity, whose objective is to create new jobs in agrotourism;
- The European Centre for Ecological Agriculture and Tourism (ECEAT-Polska) – an association founded in 1994, mainly in order to promote development and recreation in ecological holdings;
- The Polish Federation of Rural Tourism "Hospitable Farms" – an organization founded in 1995, bringing together regional agrotourism associations to promote the development of nature-oriented tourism in rural areas.

In June 2005 the Council of Ministers adopted the draft *Strategy for Tourism Development 2007-2013* and on the 26 of September 2008 the document called *The Direction of Tourism Development till 2015*. The main assumption made in the documents was that tourism is a sector closely linked to many development processes and as such should be shaped in compliance with other socio-economic national growth objectives. In the above mentioned documents the focus is not only placed on coherence on pursued activities but also on the existing synergy effect between tourism and natural environment, culture and social development. In accordance with the adopted guidelines, by making Poland a country attractive to tourists living both inside and outside the country, tourism should become an important tool used to spur socio-economic development of Polish regions.

Sustainable tourism development strategies are documents that describe environmentally friendly tourism on the regional and local level. The strategies are developed for some voivodeships, poviats, gminas and selected cities. Directions of tourism development and activities taken in this respect, usually within 8 to 10 years, are determined on the basis of results presented in the local conditions' diagnosis.

On the macroeconomic scale the implementation of the documents above unambiguously merge with the implementation of the European Union strategic objectives enumerated in the reviewed *Lisbon Strategy*, as well as with the implementation of the priorities set in the *National Development Strategy 2007-2015*, the strategic objectives of the *National Cohesion Strategy 2007-2013* and the priorities set in the *National Reform Program for 2005-2008*.

The measures related to the development of nature-oriented tourism and agrotourism are subsidized within the framework of a number of programmes such as, for example, the *Rural Development Program 2007-2013*, *Operational Program 'Development of Eastern Poland'* or other regional operational programs. Out of several dozen projects implemented in the past few years by means of different type of funding the following projects should be mentioned:

- The Network of Sustainable Tourism Development in the Baltic Sea Region (AGORA) – a project whose major objective was to develop a marketing concept for sustainable tourism and a mechanism, and specific ways, of cooperating in partnership in order to create and promote products;
- "Sustainable tourism development – tourism and protection of the natural environment" - a project implemented in cooperation with the Kaliningrad Oblast (Russia) and

aimed at supporting the achievement of sustainable tourism development with respect for the natural environment on Polish-Russian border areas;

- "Ecological tourism in ecological holdings" – a project implemented to support the development of ecological tourism in small agricultural holdings;
- Ecotourism without borders – a project promoting the natural and cultural riches of ecological tourism in the border region between Chelm – Kowel (Ukraine);
- Agrotourism a chance to revitalize and improve the economic situation of farming families in Lower Silesia – within the framework of this project a series of trainings and individual advisory consultations were conducted, which were to help farmers to set up and run an agrotourism holding.

## **5. CONCLUSIONS: PROGRESS TOWARDS THE 2010 TARGET AND IMPLEMENTATION OF THE STRATEGIC PLAN**

### **5.1 Progress towards The 2010 Target**

#### **PROTECT THE COMPONENTS OF BIODIVERSITY**

**Goal 1. Promote the conservation of the biological diversity of ecosystems, habitats and biomes**

##### ***Target 1.1: At least 10% of each of the world's ecological regions effectively conserved***

A further progress in the field of extending protection over the most valuable ecosystems has been reported. This can be observed on the basis of the development of specific forms of nature protection.

In Poland the following forms of protected areas have been introduced: national parks, nature reserves, landscape parks, areas of protected landscape, Natura 2000 sites, documentation sites, ecological sites, nature and landscape complexes. The number of national and landscape parks during the period of 2001-2007 did not change. Since the year 2000 the number of nature reserves went up (from 1307 to 1423). The number of documentation sites also increased (from 103 to 153) as well as the number of ecological sites (from 6113 to 6685), nature and landscape complexes (from 170 to 207) and, last but not least, protected landscape (from 407 to 412). In comparison to the original list of Natura 2000 sites (from 2004), including 72 special bird protection areas, encompassing 7,8% of Poland's area and 184 special areas for habitat conservation, encompassing in total 3,7% of the country's area, the Natura 2000 list includes by the end of 2008 141 special bird protection areas, which encompass 15,97% of the country's area, as well as 364 special areas for habitat conservation, which encompass 8,37% of the country's area.

It should be pointed out that Poland contributes in large to achieve Objective 1.1 by extending legal protection onto 32,1% of the total area of the country.

What needs to be strengthened is the effectiveness of these forms of biological diversity protection because in some cases they do not ensure the required efficiency. This concerns in particular the protected landscape areas that cover largest territory.

##### **Target 1.2. Areas of particular importance to biodiversity protected**

Progress in protection of areas with particular importance to biological diversity is noticeable both as far as land and water ecosystems are concerned. In particular, the following areas play an extremely important role in the battle to sustain biological diversity in Poland: wetland areas, mountain, sea and coastal areas.

### Wetland areas

A significant part of the most valuable wetland areas is legally protected in Poland. These areas have been transformed into national parks, landscape parks, nature reserves, and, in the last couple of years, into Natura 2000 sites. 13 significantly valuable areas have been included into the Ramsar Convention List of Wetlands. In order to ensure effective protection of wetland areas in Poland, the National Strategy of Protection of Wetlands, along with an action plan (for the period of 2006-2013), has been adopted in 2006. It provides for the extension of the network of wetland areas protected under the existing law. Moreover it provides for actions to be taken in order to maintain these areas. The first protection programs including but not limited to alkaline peatland, transitory peat moors and quagmire have been developed.

### Mountain areas

The most valuable natural riches of Polish mountains are protected by the law. Presently there are 9 national parks, 24 landscape parks and more than two hundred nature reserves in the Polish mountain areas. In five southern highland and mountain voivodeships 55 protected landscape areas and other forms of area protection, such as ecological sites, nature and landscape complexes, and documentation sites were established. The membership in the European Union placed an obligation on Poland to designate Polish areas to be included in the European Natura 2000 Network. In the modified and presently gradually extended a list of proposed Polish Natura 2000 sites submitted to the European Commission, several dozen environmentally valuable protected areas in the Carpathian Mountains, Sudety Mountains, Świętokrzyskie Mountains and their foreland were enumerated. Foremost these areas include special areas for habitat conservation.

### Sea and coastal areas

A part of the Polish Baltic Sea coast is covered with various forms of legal protection. They include first of all two national parks, namely, Wolin and Słowiński (the latter one recognized as World Biosphere Reserve) and a few landscape parks. There are also several areas of protected landscape along the coastline (e.g. in Żuławy Wiślane) and nature reserves. In the past few years nearly the whole area of coastal waters has been included in the Natura 2000 network.

The Baltic Sea Protected Areas (BSPA), a system comprising 62 regions in the whole Baltic area, has been established on the basis of the Helsinki Convention. Up to now Poland has submitted two national parks, Wolin and Słowiński, and two landscape parks, Nadmorski and Vistula Spit, to this system. Discussions are taking place concerning inclusion of additional open sea areas.

## **GOAL 2. PROMOTE THE CONSERVATION OF SPECIES DIVERSITY**

### **Target 2.1: Restore, maintain, or reduce the decline of populations of species of selected taxonomic groups.**

Although a progress in the activities aiming at restoring and maintaining the populations of selected species has been recorded, the scope of the activities is not adequate to the existing needs.



*Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

The conducted activities were, *inter alia*, aimed at increasing such populations of species as, for example, the common kestrel, the white-throated dipper, the peregrine falcon, the golden eagle, the lesser spotted eagle, the greater spotted eagle, common shelduck, the black stork, the Eurasian eagle owl, by extending breeding places.

Apart from the activities described above, several programmes aiming at restitution or reintroduction of selected species are being implemented, among which the following projects play a vital role in sustaining biological biodiversity:

- restitution of the peregrine falcon in the Pieniny Mountains, the bison in the Carpathian Mountains, the Atlantic sturgeon, the zarte, the Atlantic salmon and the sea trout in northern Poland and in the Upper Vistula River Basin, the water caltrop in the Oświęcim Basin, the fir in the Sudety Mountains, the taxus and the wild service tree in National Forests;
- reintroduction of the Eurasian lynx in Kampinos Forest, the European ground squirrel in the Opole Region, the edible dormouse in the forests of western Poland, the European tree frog in the Suwalki Region, the Eurasian eagle owl in Wolin National Park, the mountain apollo in the Pieniny National Park, the great bustard in Wielkopolskie Voivodeship, the European pond terrapin in Polesie, the black grouse and the capercaillie in Wisła Forest District.

Additionally, steps are taken to preserve those species of the Polish flora that have become extinct in their original natural environment. These species include, *inter alia*;

- *Primula vulgaris* - at present is being reintroduced in the areas surrounding Łańcuchów in Lubelszczyzna;
- *Senecio umbrosus*- in 1993 the only existing specimen was transferred to the experimental garden set up by the Tatra Field Station, Institute of Nature Protection, Polish Academy of Sciences (Tatrzańskiej Stacji Terenowej Instytutu Ochrony Przyrody PAN), where the reproduction of the species became a success a couple of years later;
- *Cochlearia polonica* - can be found in substitution sites because its natural location has been destroyed.

Moreover attempts are also made to reintroduce some rock plants in southern Poland, including but not limited to *Saxifraga nivalis*, *Cardamine resedifolia* L. and *Woodsia alpina*. Similar programs focusing on extinct or endangered species on the regional level have been implemented by some national parks.

**Target 2.2: Status of threatened species improved.**

In order to make protection instruments more effective, to adjust national law to Birds Directive and Habitats Directive and to implement the guidelines set forth in the Act on Nature Conservation of 16 April 2004, the following new regulations concerning the protection of species were published:

- the Regulation of the Minister of Environment of 9 July 2004 on the Protected Wild Plant Species;

- the Regulation of the Minister of Environment of 9 July 2004 on the Protected Wild Fungi Species;
- the Regulation of the Minister of Environment of 28 September 2004 on the Protected Wild Animal Species.

Fungi species were included in previously binding provisions in the regulation on the protected wild plant species. These provisions mentioned only a list of plant and fungi species under strict and partial conservation. Therefore only the plant and fungi species were protected but not their habitats and sites. Any bans related to protected plant and fungi species or any exceptions to these bans concerned all species listed in the provisions, without making any distinctions. At present there is a separate regulation on fungi species on the one hand and a separate regulation on plant species, on the other hand. These new regulations list also specifies species under partial conservation that can be grown for economic purposes and guidelines on how to grow these species, and species that require delineation of site protection zones.

The former regulation on protection of animal species defined only lists of wild animals under strict and partial conservation. The regulation did not provide any details on species in need of active conservation that are acquired for economic purposes, bird species that can be transported to Poland, provided that they were acquired legally, and, moreover, the regulation did not provide any details on the protection form of selected species. The present regulation in force stipulates the above mentioned problems and provides not only for methods of protection of selected animal species, or species groups, habitats and sites by setting up protection zones and delineating them, but also for their closed seasons. The regulation also provides for bans related to protected animal species and exceptions to these bans. Bans and exceptions to them concern specific species or species groups.

At present the amendment draft of the Regulation on Protected Wild Animal Species is in its final stage. The amendment was drafted following the European Commission's opinion that some provisions in the regulation were neither adjusted to the Birds Directive nor to the Habitats Directive. The amendment will have to take the following species into consideration: the great cormorant, the grey heron and the otter, species under partial conservation, with the exception to fish ponds regarded as fish breeding sites. The increase of the otter population many fold is an example of successful activities aiming at improving the conservation status of species. The growth of the otter population was so dynamic that in some regions it has become to be perceived as a pest.

As far as plant species are concerned, 387 species, 28 whole genera, 4 genera excluding 1-2 species and 1 family are under strict conservation.

As far as fungi species are concerned, 45 species and 7 genera, among lichens – 33 species and 19 genera and 3 genera, excluding 1 species, are under strict conservation.

As far as animal species are concerned 228 species, 2 whole genera, 1 genus excluding 2 species, 17 whole families, 6 families excluding 1-8 species, 1 whole order, 1 order excluding 4 genera and 2 whole classes (reptiles and amphibians) are under strict conservation.

Specific, detailed protection programmes have been developed for selected plant and animal species, in particular for the so-called priority species listed in the EU Habitats Directive. These programmes are in the preliminary implementation stage. They are being implemented by the area supervisors (including mainly forest services).

The main sources of information on endangered species are the Polish Red Data Books and Polish Red Lists. They include information collected on the basis of scientific research conducted over a period of many years and serve as a valuable source of knowledge when planning actions aimed at improving the conservation status of endangered species.

### **Goal 3. Promote the conservation of genetic diversity**

#### ***Target 3.1: Genetic diversity of crops, livestock, and of harvested species of trees, fish and wildlife and other valuable species conserved, and associated indigenous and local knowledge maintained.***

A significant progress in activities to preserve genetic resources of farmed animals and crops has been observed. Requirements defining the scope and method of acquiring wild species have been set. Due to the implementation of agro-environmental schemes, providing for subsidies for breeding and cultivating traditional varieties and breeds, the interest of the local communities in cultivating such agricultural practices is growing.

Activities aimed at conserving genetic diversity of farmed animals are conducted in the framework of *Protection Programmes for Livestock Genetic Resources*. Under such a program breeding of a selected endangered farmed animal breed is supported, in accordance with a defined breed and program objectives. In 2008 42 protection programmes were implemented encompassing 77 indigenous breeds, varieties and stocks of farm animals and fish.

The next task is to develop the National Strategy and Plan of Action for Animal Genetic Resources, which will comprehensively regulate the actions in this field. An important aim of animal genetic resources preservation is to create the National Gene Bank and to systematically increase the collection of biological material.

Many different research institutions, whose activities are coordinated by the National Centre for Plant Genetic Resources IHAR, collect populations and varieties of crops and wild plants endangered by genetic erosion, index these materials and preserve seeds. Up to now 73 000 objects have been gathered.

The protection of plant genetic resources is conducted in the framework of two multiyear programmes implemented by the Minister of Agriculture and Rural Development, for which funding is secured till 2013. The crops program is conducted by the Plant Breeding and Acclimatization Institute, whereas the horticulture programme by the Research Institute of Pomology and Floriculture, and the Research Institute of Vegetable Crops.

Under RDP 2007-2013 a measure was introduced aimed at preserving traditional knowledge of farmers, i.e. "participation of farmers in food quality systems". Under this measure fixed costs of participating in a chosen food quality system were refunded. The following systems can be subsidized: Protected Designations of Origin system, Protected Geographical Indications system,

Traditional Specialities Guaranteed system, organic production and integrated production. Moreover. Under the measure the "fixed costs" incurred by the farmer due to system participation, i.e. costs related to the description and registration of a traditional product, can be refunded.

*Ex situ* conservation of wild fauna is taking place in Poland in zoological gardens, aquaria, animal breeding centers and private collections. There are 14 officially registered zoological gardens in Poland and 9 of them are members of the European Association of Zoos and Aquaria (EAZA). All Polish zoos participate in the European Endangered Species Program (EEP) and collect data in pedigree books for endangered species. They participate also in the International Species Information System (ISIS).

Botanic gardens are centers that keep a collection of herbaceous plants, trees and bushes. In Poland there are 11 such centers. All of them are formally linked or cooperate with existing research institutions, such as, for example, universities, schools of agriculture, units of the Polish Academy of Sciences, which provide the botanic gardens with a research base and support them in conducting their own scientific projects. In 15 arboretums in Poland a collection of trees, bushes and small shrub is gathered. These units play a similar role as the botanic gardens. They develop scientific projects related to mainly taxonomy, acclimatization of alien species and their practical use in forestry.

Actions to preserve forest genetic diversity *ex situ* are undertaken systematically in cooperation of a network of different centers, including the following:

- 16 seed husking mills;
- 25 seed storages (regional gene banks);
- 8 seed testing stations;
- 5 seed quality control services.

The Forest Gene Bank Kostrzyca plays a special role in the strategy of genetic forest diversity preservation *ex situ*. In the Forest Gene Bank Kostrzyca genotypes in the form of tissue cultures and generative organs of disappearing or endangered populations of tree and bush species, mainly in the forests of the Sudety Mountains, where the flora is disappearing, and genotypes of the oldest trees (older than 200-250 years, depending on the species) in Poland are stored. In the Bank also endangered flora of the undergrowth are stored. The Bank has also an arboretum and container nursery that grows saplings of trees of local origin and stores them in the gene bank. These saplings are later used for restitution of extinct species in the area of the environmental disaster in the Sudety Mountains.

## **PROMOTE SUSTAINABLE USE**

### ***Goal 4. Promote sustainable use and consumption***

***Target 4.1: Biodiversity-based products derived from sources that are sustainably managed, and production areas managed consistent with the conservation of biodiversity.***

Economic activity based on the use of natural resources found in nature is pursued to a growing extent in accordance with the principles of sustainable development. This is also visible in the sectors of agriculture, forestry and fishery.

Polish agriculture is characterized by the following: large fragmentation of holdings, majority of Polish soils are of average or low usefulness to agriculture and a relatively low use of means of production. This create favorable conditions to implement the agro-environmental schemes, including development of organic farming, whose dynamic growth, spurred by the adoption of appropriate legal regulations and introduction of financial instruments to subsidize this type of activity, has been observed since 2004. The remaining agro-environmental schemes, e.g. sustainable farming, have also played a key role in stimulating sustainable use of agriculture land. A number of existing legal solutions in agricultural sector have been adopted in order to stimulate sustainable use of agricultural land. Act on Fertilizers and Fertilizing introduces limits on the use of natural fertilizers to 170 kg nitrogen/ha. The Act on Plant Protection stipulates detailed conditions for the use of means for plant protection. Under the agro-environmental schemes, the farmer is monitored whether he complies with the binding provisions.

An effective instrument to ensure sustainable fisheries management in fishing zones are fishery management plans. They delineate the authorized fishing zones and set catch limits. No less important is conservation season and minimum size of caught species. If in a given catch there is a number of specimen under the minimum size or/and it is its closed season, the catch is to be released. In order to help the populations to regenerate fishing zones are restocked. The restocking plans are also provided for in the fishery management plans.

In the past few years the use of wood resources has been taking place below the biological recovery levels, defined in accordance with the sustainable forest management principle and the principle of increasing the wood resources. As a result wood resources are gradually increasing. In the last twenty years the use of wood resources in National Forests is on a lower level than the increase in volume. This is the result of a broad implementation of the principle of sustainable forest management in the past few years. The *Certificate of Good Forest Management* is a visible proof that pro-ecological forest management is introduced in the majority of forests managed by the State Forests National Forest Holding – PGL LP. This certificate is granted by certifying organizations on the basis of standards set by the international non-governmental organization Forest Stewardship Council and SmartWood (e.g. Societe Generale de Surveillance, Nepcon). The sheer fact that such a certificate has been granted shows that State Forests are managed in such a way that they can permanently fulfill their production, environmental and social function, and provide, moreover, a guarantee that the wood bought is an environmentally friendly produced good in a production process that takes modern sustainable development requirements into consideration.

***Target 4.2. Unsustainable consumption, of biological resources, or that impacts upon biodiversity, reduced.***

In the field of unsustainable use and consumption of biological resources, an improvement can be observed resulting from the development and improvement of such instruments as, for example, environmental impact assessments and charging fees for pursuing activities using natural environment resources.

An environmental impact assessment system is regulated by the Act of 3 October 2008 on Sharing information on the Environment and its Protection, Involvement of Society in Nature Conservation and on Environmental Impact Assessments. The predicted impact on the environment of plans, programmes and policies as well as the environmental impact assessments of undertakings, in particular investments that could have a harmful effect on Natura 2000 sites, help to decrease economic pressure already at the planning stage and help to introduce necessary means to mitigate the impact.

The second instrument established to regulate the use of environmental resources is the fees for pursuing activities using those resources. The fees are paid, among others: for emissions into the air, use of water, discharge of sewage, waste disposal, tree felling, etc. Large fees (gradually increased) are an important factor stimulating conscious use of the natural environment.

A separate category of instruments regulating the size and scope of natural resources exploitation consist of various kinds of plans, programmes and permits. The most important of them are: forest management plan, catch limits and permits to acquire species partially protected.

***Target 4.3: No species of wild flora or fauna endangered by international trade.***

A significant progress in combating illicit trade in wild species has been recorded. This progress is, *inter alia*, a result of larger detectability of illicit trade in wild fauna and flora: from 114 in 2005 to 231 in 2006.

A Working Group on CITES has been set up. The group consists of representatives from the Ministry of the Environment, the State Council for Environmental Protection, the Ministry of Finance, the Customs Services, the Police, the Veterinary Inspection, non-governmental organizations, as well as of representatives of zoological gardens and the general prosecutor's office. Activities have also been undertaken to set up a working group, consisting solely of representatives of governmental bodies, which will provide for a better cooperation between specific bodies when implementing and enforcing the Washington Convention provisions. In the Police Headquarters a team to combat offences against the natural environment, including trade in endangered plants and animals listed in the Convention, has been established. This team coordinates and monitors the field activities of police units that control the domestic market, including but not limited to such actions as controls of shops and zoological fairs, as well as the sale of CITES species in the Internet. In 2005-2006 a broad training campaign has been launched with the aim to inform representatives of services engaged in combating crime against endangered plants and animals.

## **ADDRESS THREATS TO BIODIVERSITY**

***Goal 5. Pressures from habitat loss, land use change and degradation, and unsustainable water use, reduced.***

***Target 5.1. Rate of loss and degradation of natural habitats decreased.***

The loss and degradation of natural habitats is directly connected with the progressing urbanization process and infrastructure development (especially linear infrastructure). A crucial instrument used to alleviate the negative effects of land transformation is implemented in Poland under the Natura 2000 network, within the framework of which the most valuable natural habitats are under conservation. The environmental impact of each undertaking that may have a negative impact on the protected natural habitats needs to be assessed. In justified cases compensatory activities need to be undertaken. It is assumed that an effectively functioning system should slow down the pace, in which natural habitats are lost or degraded.

The loss and degradation of natural habitats has slowed down also as a result of conservation and renaturalization measures in selected areas. Thanks to these, the restoration of a large number of habitats was possible. It should however be remembered that such measures should be constantly reinforced. It is also necessary to develop an effective methodology of such activities, especially in the context of relatively recent adoption of Polish provisions on the nature compensation. As examples of initiatives taken to date can serve:

- renaturalization of Łacha Stężycka;
- conservation and renaturalization of marsh ecosystems in the Masurian Landscape Park in Strzałowo Forest District (on-going activities);
- renaturalization of Podlasie Marshes;
- numerous projects of renaturalization of minor river valleys, e.g. Piwonia River in Polesia (completed), Łasica River in Kampinos Forest National Park (under preparation);
- active conditioning measures in valuable meadow ecosystems, conducted on many protected areas and not only.

***Goal 6. Control threats from invasive alien species***

***Target 6.1. Pathways for major potential alien invasive species controlled.***

A progress has been recorded as far as the improvement of legal framework related to combating intentional introduction of invasive species is concerned. However, there is a lack of good solutions on enabling more efficient monitoring of their paths.

For many years alien species in Poland are considered as significant threat to the native biological diversity. It is estimated that more than 30% of all fish and more than 10% of all mammals in Poland are alien species, which were intentionally or accidentally introduced.

*Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

To active means of limiting migration of selected invasive species, used mainly on protected areas, belong among others:

- monitoring and systematic removal of new specimen of invasive species (e.g. the Polygonales, the black cherry, the Northern red oak);
- manipulating the species composition and promoting native species;
- appropriate shaping of the abiotic conditions.

The fact that invasive species pose a number of different threats is reflected in the existing legal regulations in Poland, gradually modified and supplemented. In the last few years a number of regulations that provide a legal framework for intentional introduction of alien species have been adopted or amended, including the Act on Nature Conservation, the Inland Fishery Act and the Fisheries Act.

Pursuant to the provisions of the above mentioned legal regulations, the introduction of an alien species into the natural environment needs to be authorized by the minister of the environment or agriculture. The import of alien species, which if released to the natural environment could pose a threat to the native species, also needs to be authorized by the minister of the environment. Acts regulating the monitoring of the number of alien species already introduced in Poland have also been amended. The number of alien game species is monitored pursuant to the Regulation of the Minister of the Environment on the List of Game Species and Hunting Seasons. Two species of alien crayfish and three alien fish species are submitted to quantitative control pursuant to the Regulation of the Minister of Agriculture and Rural Development on Fishing and Propagating, Rearing and Harvesting other Aquatic Organisms. A new Act of 3 October 2008 on the amendments in the Act on Nature Conservation and in certain other acts, which entered into force on 17 November 2008, contributed to the removal of many loopholes in previously binding provisions. A definition of an alien species was introduced, among other amendments, pursuant to which an alien species is a species occurring outside its natural environment in the form of specimen or gametes that are able to survive, spores, seeds, eggs or just a part of these specimen, thank to which the above mentioned can reproduce. The Act puts also an obligation on the Minister of the Environment to create together with the Minister of Agriculture and Rural Development a list of alien species of plants, animals and fungi, which if released to the natural environment could pose a threat to the native species or their natural habitats. A list of exceptions to applying the provisions concerning the use of alien species in woodlands and a rational agriculture and forest management has also been modified. It is said that alien species are not introduced in areas where, if released to the natural environment, could pose a threat to the native species or their natural habitats.

***Target 6. 2. Management plans in place for major alien species that threaten ecosystems, habitats or species.***

Despite the fact that in the last few years the formal and legal framework regulating the introduction of invasive species into the environment has been significantly improved, to date no satisfactory progress has been achieved in development of operational documents in this field.



An important source of necessary information needed to efficiently implement alien species management plans is the database called "Alien species in Poland" stored by the Institute of Nature Conservation, Polish Academy of Sciences. This database includes information on 804 species.

***Goal 7. Address challenges to biodiversity from climate change, and pollution***

***Target 7.1. Maintain and enhance resilience of the components of biodiversity to adapt to climate change.***

Up to date the planned progress in increasing the ability of biological diversity components to adapt to climate change, has not been fully achieved. In order to achieve this aim, actions in the following directions must be taken:

- (a) enabling passing of animal populations to more favorable habitats, connected with protection and passable conditions of ecological corridors: There are still no legal regulations stipulating the conservation functions of ecological corridors.
- (b) adapting the species composition in forests to the forecast climate changes.

***Target 7.2. Reduce pollution and its impacts on biodiversity.***

Air protection

In the last two decades Poland has made the greatest progress in air protection, advancing from sulphur-polluted and dusted country to a relatively pure country with just local aerosanitary problems, resulting predominantly from municipal and mobile sources. In most of Poland's territory, the state of air is presently good. The type and amount of basic pollution emitted into the atmosphere is mainly determined on the type and amount of fuels used in Poland. The most important and at the same time the most common pollutants are still: sulphur dioxide and nitrogen oxides. The main anthropogenic sources of air pollution are the following: commercial power industry, power production at manufacturing plants, some industrial technologies, municipal combined heat and power plants and boiler plants, transport (mainly road transport) and local sources of so-called low emission.

Water protection

Successive implementation of the provisions of the strategy and policy documents lead to visible effects in water improvement. All the same, despite regular reductions of the amount of wastewater from municipal and industrial sources, the quality of water in rivers and lakes is still not satisfactory.

Protection of soils

Soils in Poland are degraded and polluted just in a small degree. It is due mainly to the extensive agriculture methods. Only in areas directly adjoining big industrial centers larger pollution level could be observed, mainly by heavy metals. A major problem is however the progressing acidity of light soils as a result of still too high level of sulphur dioxide emissions.

Recultivation actions undertaken only on a small scale are of special importance for the improvement of soils. These activities are usually conducted on the voivodeship level – by voivodeship agricultural chambers or on the powiat level. Programs to recultivate acid soils in Wielkopolskie and Dolnośląskie provinces with natural limestone fertilizers, can serve as an example of already implemented initiatives.

## **MAINTAIN GOODS AND SERVICES FROM BIODIVERSITY TO SUPPORT HUMAN WELL-BEING**

### ***Goal 8. Maintain capacity of ecosystems to deliver goods and services and support livelihoods***

#### ***Target 8.1. Capacity of ecosystems to deliver goods and services maintained.***

Sustainable forest management, sustainable agriculture or fisheries sector plays an important role in maintaining the ability of ecosystems to provide resources essential to human beings. Constant improvement of legal acts and documents the above sectors guarantees the continuity of their sustainable management.

Poland is a country which in the predictable future is not threatened by deforestation, extremely hazardous to sustainable development, that can be observed in other regions of the world. National forest policy and the principle of ecologization of forest management consequently implemented by a strong economic organization, State Forests National Forest Holding – PGL LP, has been a guarantor of sustainable development for many years. Almost 78% of forests in Poland come under the authority of this economic entity. The supervision of State Forests National Forest Holding – PGL LP over 17% of private forests created good conditions for pursuing sustainable management, also in forest that do not belong to the National Treasury. The principles related to preserving, protecting and extending forest resources and the principles of forest management in connection with other environmental and national economic elements, disregarding the ownership of forests, is set out in the Forest Act of 1991, which recognizes the environmental, social and productive benefits from forests on equal level.

Principles of the protection of arable lands (especially those of a better grading class and those with organic soils) are stipulated in the Act on Protection of Farmland and Forestland of 1995. Unfortunately, due to the progressing urbanization processes in the last few years, mainly in and around big cities, a tendency of falling agricultural land area can be observed.

In the last few years the share of inland fisheries in the production of food in general has sunk significantly. However the role of this economic sector in sustainable environmental water resources management, aimed at protecting biological diversity and at preserving fish resources for future generations, is gradually growing. What is also diversified is the scope of economic activity, especially the one resulting from a growing interest in fishing tourism and recreation. The Polish law has obliged all entities authorized to pursue business activity in fishing to lead a sustainable fisheries management on surface waters. Fisheries management should facilitate preserving fish resources in a biological balance and on a level that will make it possible to use them for economic purposes by future generations. One of the most important elements of

sustainable fisheries management is restocking of inland waters, performed by entities authorized to pursue business activity in fishing. As a result of such activities the prevalence and the possibility to fish many valuable fish species are still possible (zarte, salmon, sea trout, European whitefish, Baltic whitefish, eel).

***Target 8.2. Biological resources that support sustainable livelihoods, local food security and health care, especially of poor people maintained.***

The mostly promoted business activity on the local level is agricultural food production, in line with the sustainable development principles. National food self-sufficiency, also in rural areas, is guaranteed as a result of a good agricultural production condition. Herb farming, subsidized by direct payments, can serve as an example of other forms of economic activity support.

In the last few year different sectors of tourism, incorporating local natural and environmental values, has been developed dynamically. Restoration and development of traditional rural areas, including meeting the social and cultural needs of the local communities, is supported within the framework of the *Rural Development Programme 2007-2013* (measure: Rural protection and development). The aim of the measure includes, but is not limited to, preserving the cultural heritage, the characteristic features of rural areas and boosting the attractiveness of tourism and investment in these areas, and at the same time maintaining their production function by taking the sustainable development principle into consideration.

Non-governmental organizations participate in the implementation of this target on the micro scale. For example, the Rural Development Foundation provides small grants to local communities actively protecting biological diversity.

**PRESERVATION OF TRADITIONAL KNOWLEDGE, INNOVATION AND PRACTICES.**

***Goal 9 Maintain socio-cultural diversity of indigenous and local communities***

***Target 9.1. Protect traditional knowledge, innovations and practices.***

In Polish conditions agricultural holdings focused on preserving historical means of land cultivation and animal breeding serve as a unique example of cultivating traditional knowledge and practices related to the protection and use of biodiversity. The majority of them promote their activities by providing services in agrotourism. The demand for this type of services is growing year by year.

Traditional management, cultivation and production methods are supported under agro-environmental schemes such as, for examples, the *Protection Programmes for Livestock Genetic Resources* and the *Strategy of Multifunctional Development of Rural Areas*.

An important effect of the activities intended to preserve the regional tradition is the protection of local products by development a List of Traditional Products and a List of Traditional Specialities Guaranteed. Actions to reintroduce traditional products made out of indigenous farm

animal species are taken by a number of breeding organizations and producers, such as POLSUS, and non-governmental organizations.

Traditional cultural landscapes, and with them traditional knowledge and practices, are also placed under conservation pursuant to the Act of 23 July 2003 on Monument Protection and Conservation.

A special role in cultivating the cultural tradition plays the Farmer's Wives' Association, cultural centers and other centers pursuing activities in this field.

***Target 9.2. Protect the rights of indigenous and local communities over their traditional knowledge, innovations and practices, including their rights to benefit-sharing.***

Due to the fact that there is a growing demand for regional products, more and more farmers producing them are granted exclusive production rights. Thus the rights of local and indigenous communities to benefit from their traditional knowledge are also protected. The following specialities can serve as examples of regional products: *osypek* cheese, various kinds of honey, plum jam, plum vodka and many more

**ENSURE THE FAIR AND EQUITABLE SHARING OF BENEFITS ARISING OUT OF THE USE OF GENETIC RESOURCES**

***Goal 10. Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources***

***Target 10.1. All access to genetic resources is in line with the Convention on Biological Diversity and its relevant provisions.***

Common access to genetic resources is not limited in any form, save for endangered and protected species. The possibilities to use the collected genetic resources depend directly on the collection size of the given gene banks. The most important units storing and constantly developing genetic resources collections are:

Gene Bank of Crop Plants – conservation *ex situ*, collecting and keeping genetic plant resources documentation; the bank has devices for long-term seed samples storages at its disposal;

Gene Bank of Pathogens – preservation and distribution of pathogens of crop plants; includes also a collection of symbiotic bacteria of leguminous plants;

Forest Gene Bank Kostrzyca – storage of genotypes in the form of tissue cultures and generative organs of disappearing or endangered populations of tree and bush species, mainly in the forests of the Sudety Mountains where the flora is disappearing, and genotypes of the oldest trees (older than 200-250 years, depending on the species) in Poland.

In the past few years not only an improvement in the access and amount of their resources could be observed (following a gradual collection expansion in such a scope that their financial and

implementation status would allow), but also a growing awareness, especially among farmers, about the possibilities of access to genetic resources collection.

***Target 10.2. Benefits arising from the commercial and other utilization of genetic resources shared in a fair and equitable way with the countries providing such resources in line with the Convention on Biological Diversity and its relevant provisions***

Both gene banks, botanic and zoological gardens, as well as some national parks and ecological organizations pursuing activities in this field are developing partnership contacts with analogical institutions abroad. Their main goal is to exchange information and share experience, jointly implement projects and mutually enrich genetic resources. In the last few years a significant revival of this type of cooperation could be recorded.

## **ENSURE PROVISION OF ADEQUATE RESOURCES**

**Goal 11: Parties have improved financial, human, scientific, technical and technological capacity to implement the Convention**

***Target 11.1. New and additional financial resources are transferred to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with Article 20.***

Till the accession year Poland was the beneficiary of net subsidies. Therefore in the beginning the participation of Poland in developing activities was very limited. In the next few years Poland started to participate more and more – from 0,024% GDP in 2000 to 0,09 % GDP in 2007, whereas 50% of these funds were transferred to the European Development Fund. In comparison to the obligations adopted by highly developed countries to allocate 0,7% of the GDP to aid development, the Polish participation is still very small but it is assumed that in the following year it will gradually increase.

***Target 11.2. Technology is transferred to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with its Article 20, paragraph 4.***

Poland is gradually developing cooperation with developing countries. For example, in 2007 a nursery and forest seed project incorporating new technologies of sapling mycorrhization has been implemented in Kyrgyzstan.

## **5.2 Progress towards the goals and objectives of the Strategic Plan of the Convention**

The recommendations made in the Strategic Plan of the Convention were widely applied in the *National Strategy for the Conservation and Sustainable Use of Biological Diversity* and in the *Action Plan for the 2007-2013*. The following strategic goals have been formulated:

#### *Fourth National Report on the Implementation of the Convention on Biological Diversity - Poland*

- to identify and monitor the state of biological diversity and existing and potential threats;
- to eliminate or limit threats to biological diversity more efficiently;
- to preserve and / or enrich the existing and restore lost biological diversity components;
- to fully integrate biological diversity conservation activities with economic, administrative and social (including NGO's) activities that impact it, while observing the right proportions between national environmental protection and social and economic development;
- to promote social awareness and foster attitudes and activities supporting conservation and sustainable use of biological diversity;
- to improve mechanisms and instruments supporting conservation and sustainable use of biological diversity;
- to foster international cooperation on a regional and global scale for conservation and sustainable use of biological diversity;
- to use biological diversity in a sustainable manner and with respect to fair and equitable distribution of benefits and costs of its conservation, including cost of desisting from development activities for protection of natural resources.

The progress towards targets of the *National Strategy* related to the recommendations of the Strategic Plan of the Convention is varied, depending on the scale of particular issues and available resources. The current situation is as follows:

#### Capacity building and provision of resources for carrying out high priority actions listed in the *National Strategy* and action plans for biological diversity

In most cases the units mentioned in the document as responsible for fulfilling particular targets and tasks have been implementing appropriate activities. However, it was not possible in all cases to fulfil all indicated targets completely, mainly due to the lack of sufficient financial resources. Difficulties in obtaining funding were also the main reason for the abandonment of some tasks and the decision to defer their fulfilment to further stages of the implementation. In the course of implementation there have often been various organisational, technical and competence difficulties, which resulted in delays with relation to agreed implementation deadlines. Despite the difficulties and problems it has been possible to start or continue a wide range of projects whose implementation has resulted in an improvement of the conservation status of biological diversity.

Another important problem is the small number of environment protection staff and the efficiency of their management. This situation should improve with the implementation of the structural reform of environment protection services which began in November 2008.

#### Inclusion of biological diversity issues in sectoral and intersectoral documents

The level of inclusion of biological diversity issues in sectoral and intersectoral documents is not fully satisfactory yet. The level of detail in treatment of those issues is very diversified. They are usually treated directionally and too generally. However, thanks to the ongoing work on existing

and new documents at the sector level and above, the level of inclusion of biological diversity issues is improving.

At the national level the issues of environment protection and sustainable use of biological diversity have been addressed in the following sectoral and supra-sectoral documents: *National Forest Policy*, *National Strategic Plan for Development of Rural Areas*, *National Cohesion Strategy 2007-2013 – Operational Programme ‘Infrastructure and Environment’*, *Operational Programme ‘Innovative Economy’*, *Operational Programme ‘Human Capital’*, *Operational Programme ‘Development of Eastern Poland’*, *Operational Programme ‘Technical Assistance’*, *National Development Strategy for 2007-2015*, *National Strategy for Environmental Education – through Education to Sustainable Development*. At the regional level the issues of environment protection and sustainable use of biological diversity have been indicated in voivodship development strategies and voivodship environment protection plans.

At the local level, environment protection issues have been addressed in most of the commune development strategies and can also be found in environment protection programmes accepted for implementation.

#### International cooperation

Transboundary cooperation on the environment and biological diversity is being developed at both the national and local levels. The Ministry of the Environment is cooperating with all neighbouring countries through Intergovernmental Commissions for Transboundary Cooperation. The Vysehrad Group for environment protection is active – the environment ministers of Poland, Czech Republic, Slovakia and Hungary have been meeting once or twice a year since 1999 in order to discuss the current problems in cooperation between the parties and to agree on common positions for international conferences and meetings. Polish-German cooperation is characterised by a particularly high number of advisory bodies, of which the main ones are: Polish-German Council of Environmental Protection, Polish-German Neighbourhood Commission of the Environment, Polish-German Nature Protection Working Group and International Lower Oder Valley Park Council. One example of cooperation at the regional level is the work carried out by Polish, Slovak and Ukrainian national and landscape parks for the East Carpathian Transboundary Biosphere Reserve.

#### Public ecological awareness

*The National Strategy for Environmental Education – through Education to Sustainable Development* accepted for implementation in 1997, is the basic document specifying activities aiming at increasing of knowledge and activation of local communities for conservation and sustainable use of biodiversity. In 1999-2000 the document has been updated and adapted to the new conditions resulting from implementation successive reforms in Poland. In 2001 the executive programme for the Strategy has been approved, that is, *The National Programme for Environmental Education* which specifies the basic educational tasks, designates bodies responsible for their implementation, possibilities and sources of funding and also specifies the timetable for their implementation. At the same time, in the Law on Education System amended in 2003, the following provisions has been introduced: the educational system provides particularly children and young people with knowledge of the principles of sustainable development and development of attitudes enhancing its implementation on the local, national, and global scales. Thanks to the

measures coming from, i.a., the National Strategy, the level of knowledge and environmental awareness of the society steadily grows although the pace of the process is still not fast enough.

#### Social awareness on GMOs

The new Act on Sharing Information on the Environment and its Protection, Involvement of Society in Nature Conservation and on Environment Impact Assessments of 3 October, 2008 is the basic document on public participation of the society and access to the information to a much wider extent than earlier. That makes it obligatory do make available, among others, GMO registers. An important role in making the society aware of threats related to GMO are played also by environmental NGOs, arranging various educational actions and campaigns. The regulations and initiatives mentioned so far result in a gradual increase in knowledge of GMOs in the society.

#### Mitigation of threats related to GMOs

In recent years considerable progress in biological safety has been made. Irrespective of supervising functions of the Ministry of the Environment, the following bodies are also involved appropriately to their competence in monitoring the regulations set down in the Act on Genetically Modified Organisms: the State Sanitary Inspection, the Main Inspectorate of Plant Health and Seed Inspection, the Inspection for Environmental Protection, the Veterinary Inspection, the Trade Inspection, National Labour Inspectorate, institutions representing custom administration with respect to legal trade in GMOs and Agricultural and Food Quality Inspection. The Ministry of the Environment may address the above bodies and ask them for checking observation of the act provisions depending on their competence. The supervising bodies performing checks *ex officio* are obliged to notify immediately the Minister of the Environment of any threats related to GMOs and the measures taken. Effective work of the above institutions require considerable subsidies, in particular their laboratories.

#### Developing the system of legal acts implementing the Cartagena Protocol.

The Act on Genetically Modified Organisms of 22 June 2001 is currently in force. Due to frequent modifications of the EU regulations applying to GMOs and also rapidly changing socio-economic situation of the country, it was necessary to update the regulations in force. Thus, in 2007 the Ministry of the Environment has started work on preparation the entirely new Act – the Law on Genetically Modified Organisms. The draft project which is to come into effect in 2009 regulates all the issues concerning the GMO, specifying terms and conditions for: GMO facilities, the contained use of genetically modified micro organisms as well as the contained use of genetically modified organisms, the deliberate release of GMO into the environment for an experimental purposes, the placing of genetically modified organisms as products or in products on the market, the coexistence of the farming of genetically modified crop plants with the farming of conventional crop plants, and making the information on genetically modified organisms available for the public. Within the framework of the project, also full use of the EU legal regulations concerning GMOs has been ensured and those regulations, which might result in any misinterpretations have been modified.



Transfer of technology in order to implementation of the Cartagena Protocol on biological safety

Transfer of technology related to genetically modified organisms takes place thanks to, i.a., Polish Technological Platforms. Their development started in 2003 and since then their activity has been continually expanded. Among others, PTP in Biotechnology aim at the following:

- development of the system of commercialisation of R&D results;
- development of the mechanism for making use of R&D results;
- supporting introduction of new technologies and biotechnological products and ensuring quality control systems, including validation of production processes and analytics;
- carrying out work on improvement of legal regulations;
- taking measures aiming at an increase of public acceptance of biotechnology.

Development in scientific and technical co-operation

In a recent few years, intensity of international contact of Polish research institutions has clearly increased. At present several important international conferences are organised each year, which are dedicated to the issues of conservation and sustainable use of biodiversity. Every fifth scientist can take part in international projects, the number of publications by Polish authors in renown international special journals has been steadily growing.