

**NATIONAL REPORT ON TRANSFER OF TECHNOLOGY
AND TECHNOLOGY COOPERATION**

Contracting Party	Poland
National Focal Point	
Full name of the institution:	Ministry of the Environment
Name and title of contact officer:	Dr Bożena Haczek
Mailing address:	Wawelska 52/54, 00-922 Warsaw
Telephone:	+ 48 22 57 92 282
Fax:	+ 48 22 57 92 555
E-mail:	bozena.haczek@mos.gov.pl
Submission	
Signature of officer responsible for submitting national report: professor Ewa Symonides, Chief Nature Conservator, Undersecretary of State in Ministry of the Environment	
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Please provide summary information on the process by which this report has been prepared.

The report was elaborated in the Department of Nature Conservation, Ministry of the Environment, on the background of information provided by the institutions concerned with the issues of technology transfer and technological co-operation in the field of the protection and sustainable use of biological diversity. The report questionnaire was distributed among several dozen entities, including:

- scientific institutes concerned with biotechnology;
- scientific institutes concerned with the protection of biological diversity;
- botanical gardens;
- scientific institutes concerned with the use of biological diversity for agricultural purpose;
- scientific institutes concerned with forest biological diversity;
- scientific institutes concerned with the inventiveness and protection of intellectual property rights;
- other Ministries concerned with the process of technology transfer and international technological co-operation;

private companies dealing with technology transfer and international technological co-operation

Inventory and assessment

1. Has your country developed an inventory of existing technologies or category of technologies, including from indigenous and local communities, for the conservation and sustainable use of biological diversity and its components, in all the thematic areas and cross-cutting issues addressed by the Convention?	
a) no	
b) an inventory under development	
c) an inventory of some technologies available	X
d) yes, a comprehensive inventory available	
2. Has your country assessed the potential impacts of relevant technologies on biological diversity and their requirements for successful application?	
a) no	
b) yes	X
3. Has your country carried out an assessment of the needs for relevant technologies?	
a) no	
b) yes	X

Implementation of some relevant articles of the Convention, relevant decisions adopted at the previous meetings of the Conference of the Parties and recommendations of SBSTTA

4. In implementing the thematic programmes of work adopted by previous meetings of COP, has your country achieved the outcomes identified in these programmes of work through technology transfer and technology cooperation?	
a) no	
b) yes, but only a few activities in some programs	X
c) yes, and a wide range of activities in some programs	
5. Has your country undertaken technology cooperation with other Contracting Parties that lack the expertise and resources to assess the risks and minimize the negative impacts of introducing alien species?	
a) no	
b) yes	X
6. Has your country taken any steps or measures to facilitate transfer of technology to and technology cooperation with other Parties to develop and/or strengthen their capacity to implement the policy, program and practice for sustainable use of biological diversity?	
a) no	X
b) yes	
7. Could you provide examples or illustrations of benefit-sharing contractual agreements which have included technology cooperation and technology transfer as benefits to be shared?	
a) no	X
b) yes	

8. Has your Government taken measures, as appropriate, to ensure, as set out in the Article 16(3) that Contracting Parties providing genetic resources are provided access to and transfer of technology which makes use of those genetic resources?	
a) no	X
b) yes	
9. Have the taxonomic institutions in your country taken any initiatives	
a) no	
b) yes, in early stages of development	
c) yes, in advanced stages of development	
d) yes, some initiatives in place and some priorities identified	X
e) yes, comprehensive priorities identified	
10. Has your country been involved in technology development and/or transfer for the maintenance and utilization of <i>ex situ</i> collections?	
a) no	
b) yes	X
11. Has the clearing house mechanism in your country been further developed in order to assist in obtaining access to information concerning access to and transfer of technologies?	
a) no	
b) yes	X

Role of public and private sectors in technology transfer and technology

12. Do you know of any examples of technology partnerships between public research and development institutions from developing countries and private sector firms from industrialized countries?	
a) the training of developing country scientists in the application of new technologies for the conservation and utilization of genetic resources	X
b) information exchange on new scientific exchange and technological advances	X
c) providing various technology components to developing country partner institutions	
d) engaging in joint research and development	
13. Has your country taken any measures or developed any programs to encourage the private sector or the public-private partnership to develop transfer technologies for the benefit of governments and institutions of developing countries, including South-South cooperation?	
a) no	X
b) yes	
14. Have any type of incentives been established in your country to encourage the participation of the private sector in conservation and sustainable use activities as a sources of new technologies and potential financiers of conservation programmes?	
a) no	
b) yes	X

Impact of intellectual property rights on technology transfer and technology cooperation

15. Are the technologies your country has accessed or wishes to access in the public domain or covered by intellectual property rights?	
a) public domain	
b) intellectual property rights	
c) both	X
16. Have intellectual property rights been a limiting factor in acquiring technologies for the conservation and sustainable use of biological diversity?	
a) no	X
b) yes	

Capacity-building for technology transfer and technology cooperation

17. Have adequate institutional structures been established and/or is adequate human capacity available to access relevant technologies, in your country?	
a) no	
b) yes	X
18. What, if any, have been the limiting factors in implementing relevant technologies?	
a) institutional capacity	
b) human capacity	
c) others	X

19. Does your country consider that access to information and training or lack thereof has been a limiting factor in access to and transfer of technology?	
a) no	
b) yes	X
20. Has your country been able to identify relevant technologies in specific areas for the conservation and sustainable use of biological diversity in your country?	
a) no	
b) yes	X
21. Has your country developed national policy and established international and national institutions to promote technology cooperation, including through the development and strengthening of technical, human and institutional capabilities?	
a) no	
b) yes	X
22. Has your country established joint research programmes and joint ventures for the development of technologies relevant to the objectives of the Convention?	
a) no	
b) yes	X

Measures for facilitating access to and transfer of technology

23. Has your country established the mechanism and/or measures to encourage and facilitate the transfer of technology to and technology cooperation with other Contracting Parties?	
a) no	
b) yes	X
24. Has your country established channels for access to the technologies developed and applied for attaining the objectives of the Convention?	
a) no	
b) yes	X

Success stories of and constrains to technology transfer and technology cooperation

25. Has your country identified any success stories and opportunities of and constraints to transfer of technology and technology cooperation?	
a) no	
b) yes	X

Further comments

Inventory and assessment

1.

There is no comprehensive inventory of all the technologies which are applied nationally, however such inventories are managed in many fields of activity. The examples are: partial inventory in the field of redevelopment of tree stands, that is managed for 50 years for the areas affected by pollution; fishery statistical system; inventory of existing reproduction and crop technologies for protected and endangered species, and those under extinction; database of *ex situ* collections of the protected and endangered plants in Polish botanical gardens; inventory of animals of game, that forms the basis for the protection and exploitation of hunting species.

2.

The examples of assessments being carried out of potential impacts from relevant technologies on biological diversity.

- according to the *Act on Genetically Modified Organisms*, when a new genetically modified organism is to be introduced, detailed assessment is carried out with the aim to determine environmental impact from the modification in question, including that on related species, and on any others living in that environment;
- The *National Programme for Biological Safety* is under development which is to provide for required safety level of natural environment from the part of genetically modified organisms, by means of implementation of regulatory framework (legal provisions), administrative framework, risk assessment methodology and risk prevention, and information exchange and public participation;
- assessment of potential impacts from biotechnological methods applied in reproduction of farm animals was carried out;
- assessment of impact from certain farming methods on biological diversity was carried out, e.g. change in traditional method of agricultural farming (relinquishment of cattle grazing which leads to extinction of less expansive plant species);
- assessment of various *ex situ* reproduction technologies was carried out for protected, endangered and vanishing species, that proved high usefulness of *in vitro* culture techniques;
- monitoring was managed and assessment was carried out of the resources of all fish stock being exploited by the Polish fishery on the Baltic Sea;
- taking over fruit farming sites from the areas endangered by civilisation impact and their transfer into *ex situ* collections was surveyed, as well as their valuation according to definite descriptors UPOV, JPGRI, etc. (apple, pear, sweet-cherry, cherry, plum, and common walnut trees, and certain berry bushes);
- economic and ecological assessment of forest fires was carried out to determine economic, natural and environmental, and social impacts from large forest fires (impact on productive and infrastructure functions of forest, and land reclamation, and management costs);
- assessment was carried out of impact on forest environment from measures to control insect-pests with use of insecticides;
- methods were examined for redevelopment and maintenance and protection of woodland crops and greenwoods which originated in result of redevelopment of forest stands, and the guidelines for forestry practice were developed in this regard.

Implementation of some relevant articles of the Convention, relevant decisions adopted at the previous meetings of the Conference of the Parties and recommendations of SBSTTA

3.

The most needs concerning respective technologies relating to protection and sustainable use of

biological diversity have been satisfied by the technologies developed in co-operation with other Polish science and research institutions. Certain technologies were developed in co-operation with other European countries. Some examples of the needs assessment in this regard are given below.

In the National Report on the state of genetic resources, that was prepared for FAO in the framework of the *First Report on the State of Animal Genetic Resources World-Wide*, within the national priorities, the needs were identified in relation to carrying out scientific research, and to expansion of activities concerning *ex situ* protection. One of the priorities is to develop and use the biotechnology methods, such like cryo-conservation of germ cells, spores and cellular lines, technology of supported reproduction, cloning to preserve animal biological diversity, and protection of vanishing animal races and species. Also, extraction from the State Budget of a pull of financial resources for activities relating to the protection of agricultural biodiversity is considered priority, and in particular:

- the support to programmes for the protection of genetic resources of domestic animal races and varieties, including, first of all, covering the costs of maintenance of animals in herds participating to the protection programmes, purchase of breeding material endangered by its liquidation, and collecting and storage of biological material;
- the preservation of the most valuable genetic resources of farm animals;
- the initiation of new and promotion of already implemented programmes for preservation of the most valuable genetic resources of farm animals;
- the implementation of a system for collection and storage of biological material of highly efficient races in view of preservation of their genetical diversity.

Assessment of the needs was carried out as regards reproduction technology of protected, endangered and vanishing plant species. Since conventional reproduction techniques have only proven their usefulness in relation to certain *ex situ* cultivated plant species, the *in vitro* cultures have appeared the most efficient reproduction methods. Research on development of methods for reproduction of species *in vitro* conditions requires financial outlay. Also, development of technology, that is based on deep tissue freezing in liquid nitrogen would be necessary. Bank of seed of endangered plants to be stored in liquid nitrogen is under preparation. Another important element is the plant re-introduction into natural stands and their monitoring in connection with assessment of the effects from particular environmental factors on the condition, number of persons, and behaviour of such populations, that will allow to identify the factors which are critical for their development. It needs the activities to be intensified with the aim to collect seeds of endangered plants from adequate number of stands.

Assessment of the needs concerning redevelopment of tree stands was carried out. The current qualitative and quantitative changes in polluted air in Poland require assessment to be carried out of the redevelopment process under way, particularly as regards the choice of tree species, by means of elimination of the species to be introduced (red oak, Austrian pine, Weymouth pine, Japanese larch, black cherry) in favour of native species (i.e. to enhance the role of Scotch pine, Norway spruce and leafy trees and restitution of European silver fir).

4.

The results determined in those work programmes have been achieved principally by means of own research, but not in result of technology transfer. Of course, international co-operation is carried out, that consists in participation to conferences, workshops, seminars and study tours. Joint projects are under implementation and joint scientific publications are being prepared. Joint databases are being developed.

The co-operation in the field of the protection and sustainable development of forests develops particularly intensively. The Ministerial Conferences on Forest Protection in Europe, known also as the Pan-European Forest Protection Process, as well as the Helsinki Process before, all consist a voluntary

co-operation initiative in Europe in favour of the protection and preservation of the European forest heritage. This co-operation which was initiated with the 1990 Strasbourg Ministerial Conference, has been continued nowadays, being a discussion forum on forestry in Europe, and constituting a contribution by our region into a world-wide debate on the role of sustainable forest management in achieving sustainable development.

The co-operation is carried out in the field of biological diversity of inland waters, semi-wet areas and ecosystem approach, *inter alia*, in the framework of the International Hydrological Programme, UNESCO MAB. The co-operation concerning biological diversity in agriculture is carried out in the framework of agro-environmental programmes of the European Union, as well as in the framework of, *inter alia*, the EFABIS project which is in favour of development of the national databases on domestic farm animal races, and of linking those databases to both European and world-wide databases. Regulation of fishing work outcome and fish stocking of the Baltic Sea is carried out in the framework of the co-operation in the field of biological diversity of the marine areas.

5.

The works are under way on establishment of the Internet-based network (NOBANIS) of the Nordic/Baltic Invasive Network databases on alien species occurring in countries of the Baltic Sea basin. This network is to comprise the alien species living in terrestrial environment and also in inland and marine waters. The aim of this network is to facilitate information interchange and development of regional co-operation in the field of solving the problem of alien species. On the Polish part, the Institute of Nature Conservation, Polish Academy of Sciences, in Cracow, participates to those works.

Marine Fishery Institute, in Gdynia, manages for the co-operation with the countries, who exploit the Baltic resources, by means of exchange of both the fishery statistics and the results of monitoring of age-structure of fish-stock under exploitation.

9.

Certain initiatives have been undertaken with the aim to identify the national priorities for new technologies:

- the assessment is under way of the usefulness of new technologies in animal production and protection of animal genetic resources;
- the priorities were identified in the field of protected, endangered and vanishing species in *ex situ* conditions, and the species were identified which are anticipated for development of reproduction technology and establishment of *ex situ* collections;
- the „Guidelines for the Integrated Management of the Watershed-Phytotechnology and Ecohydrology” were developed and published;
- the expert-opinion was prepared on the „Assessment of the current status of organisation of gene resources of utility plants in Poland, and the proposal for system conforming to the principles laid down by the Convention on Biological Diversity”, the priorities were identified, and the activities were undertaken with the aim to get deeper in the knowledge on biological diversity on genetic level of the crop plants with use of DNA analysis techniques;
- the conference was organised on „Experimental Taxonomy - the State of the Art and the Perspectives for Its Development in Poland”, in Gdańsk, 2001.

10.

A number of technologies for acquiring and use of *ex situ* collections were surveyed. For each species surveyed, a detailed documentation was prepared concerning the stands, where the plants have originated from. In some cases, successful introductions were carried out into selected stands and selected natural habitats. The usefulness of these habitats was tested with use of controlled crops and continuous

monitoring of the stands. When establishing preservative crops, conventional horticultural technique of vegetative reproduction was applied, as well as *in vitro* culture method. For certain species, gene bank for especially endangered species was developed *in vitro* conditions. The most important achievements include, successful reintroduction of *Aldrovanda vesiculosa* and *A. Cuneifolium*. The appropriate technologies and species reproduced with use of this technique will be put on the website under entry of the *Polish Botanical Collections* (<http://bobas.ib-pan.krakow.pl/herb/herbar.htm>). On this website, there is a computer database on herbarium collections and other botanical collections in Poland (available in English language), that contains information on the institutions and collections they possess (e.g. year of foundation, number of species and their geographical range, transfer conditions). So far, certain technologies were transferred free to other countries, e.g. *Aldrovanda vesiculosa* to the Czech Republic. The results obtained are published and they are in this way available publicly, whereas unavailable are the technologies in their various development phases.

Botanical gardens used to send plants from maintained *ex situ* collections to other botanical gardens world-wide on the basis of „*Seminum Indexes*” managed by those gardens.

In the Powsin Botanical Garden (in Warsaw), who is the Centre for Preservation of Biological Diversity, bank of seeds of rare, endangered and protected species was established, those are kept in liquid nitrogen. As regards the methods for the assessment and protection of plant biological diversity in *ex situ* conditions, educational programmes have been prepared for schools and students. The subject of international exchange are information technologies applied to management of *ex situ* collection databases. Technology transfer is effected by means of managing training courses in this regard for East and South European countries.

Having in mind the concern about preservation for future generations of endangered forest ecosystems, the Forest Gene Bank was built in the locality of Kostrzyca. In that way, technical conditions were established for active protection of biological diversity in the mode of long-term storage of gene resources of the most valuable specimens of trees, bushes and plants of the forest floor. The Forest Gene Bank manages for study visits which are attended by the representatives of numerous European countries, who have in that way the opportunity to familiarise with the technologies applied.

In 1950, the Collection of Industrial Micro-organism Cultures of the Biotechnology Institute of the Agricultural and Food-processing Industry was established. Yeast (wine, barm, distillery, fodder) were collected there, as well as hyphae fungi and bacteria. There is a survey carried out in the Collection of Cultures, on the methods for storage of seedlings in a manner which guarantees stability of their biotechnological features. Micro-organism strains are stored with use of several parallel methods, i.e. traditional method consisting in grafting the micro-organisms with use of lyophilization, and with cryo-preservation method (in fumes of liquid nitrogen). In 1992, the Collection of Cultures became the member of the European Culture Collection Organisation, that is the organisation which groups the majority of the European collections, that enables unification of the standards for managing the collections of cultures. In 1993, the Collection was granted the status of the National Depository Authority, in the framework of whom the micro-organisms comprised within patent procedure are approved according to the principles under the Budapest Treaty. The Collection of Cultures participates to the framework EU programme titled „*European Biological Resource Center Network*”. The programme is inspired by OECD initiative aimed at adaptation of the collections to the 21st Century requirements. During the Project, a thematic network is under construction between selected European collections, that enables for information flow on genetic resources of the culture collections.

11.

Information system on genetically modified organisms is under development. Database was established on the consents for experimental use of GMO (contained use and field experiments), the permits to place

GMO on the market, and those to transit GMO products. The database is available on website www.mos.gov.pl/GMO. The database will be expanded, with *inter alia*, information on the access to the up to date technologies and their transfer. Also English language version of the website will be prepared.

Role of public and private sectors in technology transfer and technology

12.

Conferences, seminars, training courses, etc. on, e.g. technology for long-term storage of seeds, production of seeding material, management of database on *ex situ* collections, and others, are organised successively. They are mainly the representatives of Central and East European countries, who usually participate to such meetings.

14.

After Poland's accession to the European Union, the country will be obliged to implement its agro-environmental programme within legal framework as laid down in the Council Regulation (EC) 1257/1999 and the Commission Regulation (EC) 445/2002. That programme constitutes the most important financial instrument of the European Union as regards the protection of natural productive space in agriculture, that serves for strengthening the patterns for sustainable practices in agriculture. During the pre-accession period, the agro-environmental programme will be tested in form of a pilot programme in the framework of SAPARD Programme in selected country regions which characterise by high natural values, or by the environments sensitive to the area hazards. The aim of the programme is to encourage farmers, by means of establishment of a respective financial assistance system, to comply with such principles for the protection of the environment and the promotion of nature conservation, those go beyond usual good agricultural practices.

Capacity building for technology transfer and technology cooperation

17.

Ministry of Science and Information Technology is concerned with co-ordination and stimulation of scientific studies on new technologies, including biotechnology, as well as with the support to the international co-operation in this regard.

Poland has in its disposition specialised scientific and technical staff, who is in position to obtain access to new technologies.

18.

The lack of financial resources is the main limiting factor in implementing relevant technologies. For instance, unprofitable animal production in agriculture limits both the investments and the interest in new technologies.

19.

For many cases, the access to information and training is a factor limiting the access to and transfer of technology. For example, there is lack of co-operation on establishment of the programmes for the protection of rare and vanishing species *ex situ* among botanical gardens. Lack of training and lacking access to information (concerning fire protection) among the owners of private forests causes, apart from lacking financial resources, the reason for increased fire hazard in non-State-owned forests.

20.

As it was already mentioned in point 1 above, there is no comprehensive inventory of technologies applied nationally. The examples are given below of technologies applied in the areas characteristic for the protection and sustainable development of biological diversity:

- inventory of the stands of rare and vanishing flora species, creation of national collections,

- reproduction of old varieties of trees and bushes;
- cryo-conservation technology of isolated biological material;
- surveying the variability (by molecular methods) of gene resources;
- storage of plant gene resources by *in vitro* method;
- establishment of the seed banks and collections the gene resources;
- measures to regulate fishing activity on the Baltic Sea;
- comprehensive system for fire protection in forests;
- synthetic pheromones and karyomones of harmful forest insects;
- biological preparations based on *Bacillus thuringiensis* bacteria,
- focal and comprehensive forest protection method;
- faunistic elaborates on selected groups of organisms with regard to zoocenological structure of the groups and genetic polymorphism of the populations as the basis for assessment of the future changes.

21.

The issues of the access to technology and its transfer, and those of technological co-operation have been only to a limited scope provided for within legal regulations. There are several Acts regulating selected aspects of technology exchange, mainly in view of provision of the State security. The *Act on the principles for detailed control of foreign marketing of commodities and technologies in relation to the international agreements and obligations* controls trade in hazardous commodities and technologies, including the organisms which have the sequences of pathogen nucleic acids, and those originating from the organisms specified in a special list by Minister of Economy. The *Act on foreign marketing of commodities and technologies of strategic importance for the State security* regulates the principles for foreign turnover of the commodities, technologies and services having strategic importance for the State security, as well as for retaining international peace and security, the principles for control and inventory of this turnover, and the responsibilities of illegal marketing of those commodities, technologies and services. The aim of the *Act on the compliance assessment system* is, *inter alia*, to remove technological barriers on trade, and to facilitate international turnover of commodity. The *Act on the protection of the crop plants* regulates the principles for imports into the Polish customs area, exports from this area, and movement of the plants and plant products in the framework of the transit procedure in view of phytosanitary security. The *Act on Genetically Modified Organisms* regulates exports and transit of the GMO products, whereas the *Act on nature conservation* lays down the principles for movement across the state border of plants or animals, their parts and derivative products which are subject to restrictions under international agreements.

Ministry of Science and Information Technology is concerned with co-ordination and stimulation of scientific studies on new technologies, including biotechnology, as well as with the support to the international co-operation in this regard.

22.

The initiatives of the joint research programmes aimed at development of technologies applied to fulfil the objectives of the Convention on Biological Diversity have been quite long ago undertaken by botanical gardens in Poland. The joint research programmes were developed and established concerning both the activities managed by all the botanical gardens and the development of new technologies applied to fulfil the objectives of the Convention in the field of the protection and establishment of preservative crops of vanishing species. Glossary of botanical terms was developed. Joint research activities have been undertaken with the aim to exchange information and develop protection technologies for gene resources in the framework of the *5th Framework Programme of the European Union*. Ministry of Agriculture and Rural Development elaborated programme for the protection of gene resources of the crop plants and farm animals. Large research programmes are managed by the Forest Gene Bank, in

Kostrzyca. The co-operation between the Baltic Countries develops with the aim to protect forest against fire hazards. During the 2nd Baltic Conference (Kuopio 2000), tasks were formulated concerning fire hazards in forests, their assessment methods, and those for detection and monitoring of forest fires; forest fires and their environmental impact; transboundary operating co-operation in the field of fire protection, training and technical progress.

The joint programmes are implemented, *inter alia*, with use of GEF, PHARE, FAO and UNEP resources.

Measures for facilitating access to and transfer of technology

23, 24

The representatives of the Polish science have the opportunity to attend the national and international conferences, symposia and seminars, where they participate to information exchange, enter personal contacts, and where the ideas for joint research projects emerge. The research results and databases are increasingly presented on generally accessible websites. For example, information on the Polish botanical collections is available on <http://bobas.ib-pan.krakow.pl/herb/herbar.htm> . It is the responsibility of the Polish scientific, research and development institutions to implement new technologies. The co-operation with numerous foreign scientific centres is carried out. Poland entered trade agreements with many countries, that facilitate transfer of commodity and technology.

Success stories of and constraints to technology transfer and technology cooperation

25 A

International co-operation develops successfully between scientific institutions, as well as among scientists in particular disciplines relating to the protection and sustainable use of biological diversity. Examples of such co-operation are, *inter alia*, launching international co-operation by the European botanical gardens in the field of *ex situ* protection of endangered plants; establishment of the network of seed banks and a central database on the collections managed; co-operation between the Baltic Countries in the field of fire protection of forests.

Scarce financial resources are the main limiting factor which reduces both the opportunities to carry out own research and technological co-operation. Available resources are not shared evenly. Low outlays are appropriated to research which does not result in measurable economic effects, e.g. for surveying fish species which do not create numerous concentrations, and hence have no significant importance for Baltic fishery. Lack of many is perceived for studies relating to documentation of endangered *ex situ* objects, protection of entire areas having cultural and scientific value, and that fulfils a role important in development of natural environment. Due to lacking financial resources it is not possible to develop more broadly the studies on the methods alternative in relation to the field ones, for carrying out the collection and its documenting with use of molecular methods.
