

**Sources of Existence:
Conservation and the sustainable use of genetic diversity**

Policy document of the Government of The Netherlands

We depend largely on animals, plants and micro-organisms for the production of food and medicines. They are the sources of our existence.

The conservation and sustainable use of genetic resources is vital to our life in general and to numerous social activities. The Netherlands is among the countries most actively working on the development and adoption of policies, regulations and legislation pertaining to genetic resources. This document provides a summary of the basic principles, activities, policy and plans of the Dutch government regarding this crucial issue.

Policies and regulations are only part of the strategy of The Netherlands. A stakeholders' Genetic Resources Platform has been established to supervise execution of the activities resulting from the document's policies. This Platform will undertake a number of integrated activities, such as reinforcing the economic position of The Netherlands and developing codes of conduct for businesses and institutions with respect to genetic resources. Additionally, a National Information Centre on Genetic Resources has been established. It is accessible on the Internet, offering a summary of the genetic resources collections available in The Netherlands and supporting the exchange of information.

On an international level, The Netherlands will prioritise the following:

- The implementation of the International Treaty on Plant Genetic Resources for Food and Agriculture;
- Further agreements on the exchange of genetic resources and a fair distribution of the benefits resulting from their use during the 6th Conference of Parties to the Convention on Biological Diversity, to be held in The Hague in April 2002.

The Dutch government sincerely hopes that all participants will do their utmost to make the conference a success, not only for our mutual benefit but for the greater good of developing countries and plant and animal life in general.

The State Secretary of Agriculture, Nature Management and Fisheries of The Netherlands
G.H. Faber

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1. Introduction and context

1.1 What is the problem?

The biological diversity on Earth is being swiftly reduced. Scores of plants, animals and micro-organisms become extinct each year, often before we have even had the chance to study them properly or assess their potential value. Unfortunately, the loss of diversity is not restricted to the extinction of species. There is also a reduction in variation within species, both in the wild and among those which we use in agriculture, food supply and so on. The total decline in variation between and within species is also referred to as genetic erosion.

Unique life forms with their own intrinsic value, the results of centuries of combined natural development and/or human selection, are therefore disappearing at a rapid pace. These losses may have serious consequences for the current or future development of agriculture, food supply, forestry, fisheries and nature management. It can also restrict our options with regard to using genetic resources for more sustainable forms of production; for example, medical purposes, stimulants, luxury foods, clothing, building materials, fuel and dyes.

1.2 Why this policy document?

The Dutch government has emphasised the importance of genetic resources for sustainable development in a number of recent policy plans and documents concerning various fields, including:

- Biodiversity;
- Nature management;
- The environment;
- Agriculture;
- Biotechnology.

The best guarantee for maintaining variation in micro-organisms, plants and animals is conservation of their natural habitats. In the case of wild diversity, it concerns conservation of eco-systems and nature reserves. In the case of domesticated or cultivated varieties, it involves conservation of the habitat best suited to them, such as areas with traditional forms of agriculture.

This document describes the policy as stated for these issues, providing a cohesive policy for various types of genetic resources managed in the field and in collections. It addresses the different applications of genetic resources and illustrates the commitment of The Netherlands on an international level.

There is an increasing social commitment to finding structural solutions to the loss of biodiversity and ways of achieving sustainable use of genetic resources. This document provides coherence in dealing with genetic resources. The government intends to reinforce cooperation with commerce, research and social organisations by means of this policy document.

Internationally, there is a growing awareness of the need for agreements on the best way to exchange genetic resources. At the UN Conference on Environment and Development (Rio de Janeiro, 1992), it was agreed that every country has sovereign rights to their genetic resources. Many countries have secured these rights in their national legislation. On the other hand, genetic resources have been exchanged internationally for centuries, acquiring value only after a (long) process of research, testing, breeding and/or commercialisation. A certain protection of intellectual property rights is often required to maintain and encourage the innovation process.

1.3 Definition of genetic resources

Genetic resources are part of the entire biological diversity. They concern all material containing the hereditary building blocks for animals, plants and micro-organisms, with an actual or potential value to humanity.

The Convention on Biological Diversity (CBD) defines biodiversity as the variability among living organisms of all types of origin, including terrestrial, marine and other aquatic ecosystems, and the ecological complexes of which they are a part. This encompasses the diversity within species, and between species and ecosystems.

The CBD defines genetic resources as genetic material of an actual or potential value. Genetic material is defined as all material of vegetable, animal or microbial origin that contains hereditary building blocks. This can involve material in its natural situation or material preserved in, for example, laboratories, gene banks or botanical gardens/zoos.

Genetic resources can be of value for agriculture and fisheries, food production, science and technology, cultural history, forestry, nature management, energy recovery, pharmacy, trade and so on. And the economic significance of the use of genetic resources is enormous. One global estimate predicts that the market for products based on genetic resources could be between 500 and 800 billion US dollars per year (source: Kate, K. ten & S.A. Laird (1999), *The commercial use of biodiversity*. Earthscan, London).

Human genetic material

This policy document covers microbial, plant and animal genetic resources, not human genetic material. In The Netherlands, policy and legislation on human genetic material fall under the remit of the Ministry of Health, Welfare and Sports.

Global commons

The deep seas form an almost virgin territory of genetic resources, where remarkable life-forms have developed as a result of the extreme circumstances found at such great depths. There are indications that micro-organisms, plants and animals in deep seas possess unique genetic material that can be of value elsewhere, with properties such as resistance to low temperatures or the ability to generate proteins in oxygen-free conditions.

In the 4th National Environmental Policy Plan, the Dutch government reaffirmed that areas not assigned to individual countries must also be managed in a sustainable manner. International agreements must be made on genetic resources found in such “global commons”. The level of protection must be comparable to that applied to resources within national territorial zones. Therefore, the government will apply the policy, as determined in this document, to genetic resources found in global commons.

Hereditary building blocks

As previously stated, genetic resources contain all genetic material of actual or potential value. In decreasing size, they consist of:

- a. Organisms corresponding to a species, sub-species, variety, race, breed and/or strain;
- b. Reproductive parts of organisms, such as seeds, grafts, egg and seed cells;
- c. Hereditary material such as specific genes or DNA fragments.

Sources of Existence covers all these forms of genetic resources. Often, the emphasis is on the management of organisms and their reproductive parts. However, separately conserving, managing and using other hereditary material is increasingly feasible. Dealing with this type of genetic resources requires different techniques, regulations and laws.

1.4 Importance of genetic resources

We use genetic resources in many ways, such as in agriculture and food production, forestry, fisheries, the production of medicines, and in environmental and water management (wastewater purification, for example). Its economic impact is extensive, both nationally and internationally. The Netherlands holds a leading position in the export of seeds and breeding material for agriculture and livestock breeding. It is an important centre of microbiology knowledge, with globally outstanding scientific research and a leading role in the food and pharmaceutical industry. Consequently, access to microbial genetic resources is crucial to this country.

In developing countries, most farmers, foresters and fishermen are directly dependent on plant and animal varieties for their subsistence. These have been developed over generations to suit their specific local conditions. These countries often find that they have no choice other than to sell off their natural resources due to a lack of alternative sources of income. They also want to benefit from the profits made by western countries using genetic resources originally found in developing countries.

Similar to other countries, The Netherlands is heavily dependent on the availability of genetic resources in the world. Intensive exchange of genetic material between different countries has existed for a long time, especially in the agricultural and food supply sectors. Virtually all food crops used in The Netherlands today have their origins in other countries. From this global perspective, it is obvious that The Netherlands should contribute substantially to conservation and sustainable use of all the Earth's genetic resources.

The tulip and the Friesian-Dutch cattle breed offer two illustrations of this international dependence:

- The EU has a 60% share in the global seed market, of which The Netherlands is the largest exporter (total commercial value of circa. 0.7 billion euros). An important part of this figure is taken up by the market for “Dutch” tulips, which originally came from Central Asia and Turkey and are now exported the world over.
- The Dutch animal breeding sector is among the world’s most important, with a total commercial value of circa. 0.5 billion euros. In the past, the Friesian-Dutch cattle breed was exported to the US with considerable success. The variegated black Holstein Friesian breed developed there in turn laid the basis for the success of the current Dutch cattle breeding sector.

The Netherlands therefore has a major economic interest in ensuring the continuing availability and accessibility of genetic material, both worldwide and within The Netherlands. This is especially true for the production, processing and export of agricultural products, ornamental plants, seeds and livestock.

Proper cooperation is essential, both with countries from which materials originate and with countries that do not have the capacity available to manage their genetic resources properly or carry out international regulations.

1.5 International developments

The focus on genetic resources has greatly increased over recent years due to pioneering developments in life sciences such as microbiology and biotechnology. Many new products are being conceived based on genetic resources. Because it concerns living organisms, the main question is how far and in which manner researchers and businesses will obtain intellectual property rights to innovations, which often require significant investments.

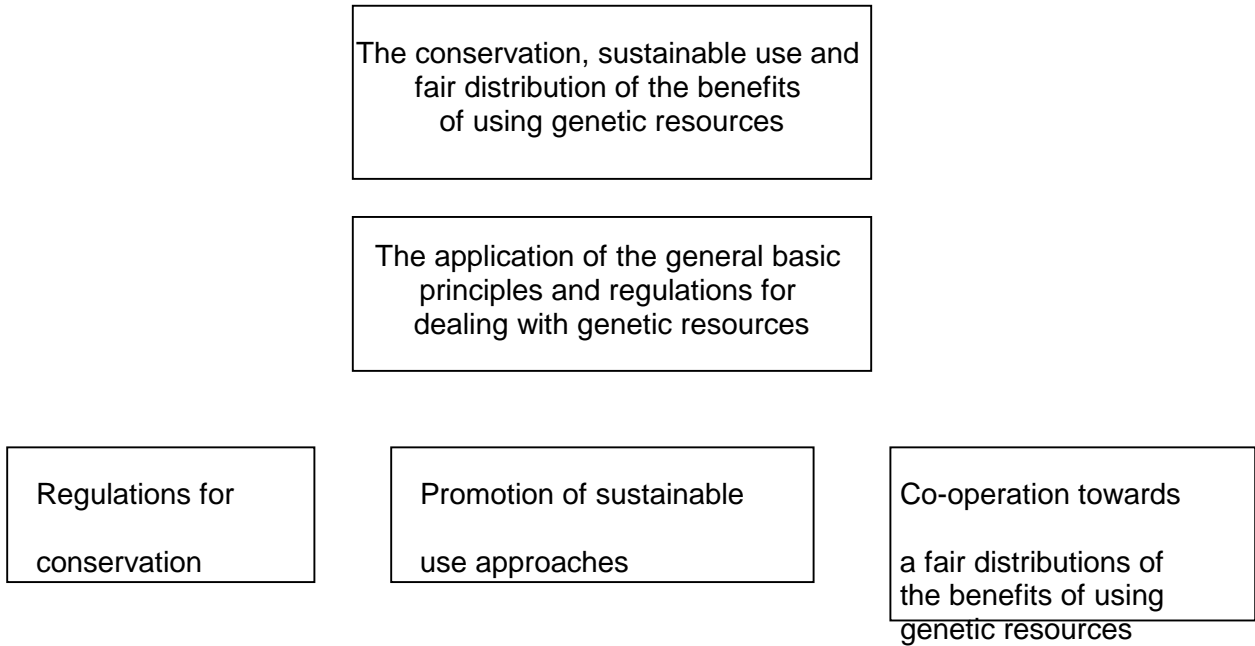
The Convention on Biological Diversity (CBD) emphasises the fact that every country has sovereign rights to their genetic resources. Seeds, for example, cannot be taken abroad unconditionally without previous authorisation. Another agreement is that countries of origin will receive an equitable share of the benefits produced by the use of their genetic resources.

Discussions on how to implement this agreement are continuing. The Netherlands aims at reaching agreements on access to genetic resources and a fair distribution of the benefits resulting from their use during the 6th Conference of Parties to the Convention on Biological Diversity, to be held in The Hague in April 2002.

In November 2001, the Food and Agriculture Organisation of the United Nations (FAO) agreed upon a new legally binding International Treaty on Plant Genetic Resources for Food and Agriculture. Specific agreements were concluded on the utilisation of genetic resources of the main crops used in agriculture and world food supply, such as rice, maize, potato and wheat. These genetic resources will remain openly accessible for research, training and breeding so long as these activities do not result in a patented product that would limit further use. Developing countries will be supported in the management of these resources. An example is the creation of centres for the exchange and development of varieties specially designed for specific local conditions.

1.6 Issues addressed

Briefly summarised, *Sources of Existence* refers to:



The general objectives set by the government are outlined in Section 2, and specified in detail in Sections 3, 4 and 5. Section 3 deals with the application of general principles and regulations for dealing with genetic resources. Section 4 considers the promotion of sustainable applications, both commercial and non-commercial. Section 5 illustrates the commitment of The Netherlands on an international level.

2. Outline of Dutch policy

2.1 Objectives of the Dutch government

Dutch governmental policy documents on nature management and the environment, as a whole, form the revised national strategy for biodiversity (*Nature for people, people for nature* and the 4th National Environmental Policy Plan). These indicate that the main objectives pertaining to the policy on genetic resources are based upon the Convention on Biological Diversity (CBD).

The main objectives stated in the CBD are:

- Conservation and sustainable use of genetic resources;
 - Fair distribution of the benefits resulting from their use.
- Fair distribution is essential. Although most genetic resources originate in developing countries, the developed countries profit most from their use.

The main objectives will be achieved deploying four strategies:

- Applying general basic principles and regulations;
- Conserving genetic resources;
- Promoting approaches for the sustainable use of the resources;
- Reinforcing national and international cooperation focused on a fair distribution of the profits resulting from the use of these resources.

The policy will be tested against the following:

1. The breadth of basic food production and human diet in the world. This will be monitored via the main crops (and the varieties therein) providing 75% of the calories and proteins needed in our diet.
2. National genetic diversity. A major milestone in this respect is that all rare indigenous farm animals of international importance within The Netherlands are no longer endangered by 2010.
3. The contributions made by The Netherlands towards sharing the benefits resulting from the use of genetic resources. The number of institutions in The Netherlands that have incorporated clauses on this subject into their contracts with partners from developing countries will be evaluated, as well as the number of projects incorporating the exchange of knowledge with institutions abroad.

2.2 Progress indicators

Realisation of the above objectives is partially dependent on national and international results attained in agriculture and food production. The government proposes to set goals that are as concrete as possible by specifying its policy on genetic resources in detail. In the process, indicators will be developed to monitor and evaluate progress. This will be linked to the development of indicators at an international level (see Section 5).

2.3 Implementation of the policy

For the implementation of this policy document, it is essential to increase the exchange of information regarding The Netherlands' genetic resources. The National Information Centre for Genetic Resources was recently set up as a part of an international network of so-called "national focal points". The Information Centre cooperates closely with:

- Centre for Genetic Resources, The Netherlands, in Wageningen and Lelystad (plant and animal genetic resources);
- Alterra (the main Dutch centre of expertise on rural areas);
- Fungal Biodiversity Centre (CBS; micro-biological genetic resources);
- Expert Centre for Taxonomic Identification

The National Information Centre (www.absfocalpoint.nl) has started to make an inventory of available genetic resources in the Netherlands in the form of a databank. This will provide a better overview of those holding collections of genetic resources in The Netherlands and the genetic material in those collections, as well as field resources of national or international relevance. The Netherlands hereby contributes to the global accessibility of information on genetic material.

Information on how resources, both within this country and abroad, are managed and utilised will be collected and distributed. Information on policy, regulations and legislation and instruments governed by private law, such as Codes of Conduct and Material Transfer Agreements, will receive special attention.

In The Netherlands, the opinion prevails that indigenous and local communities must be closely involved in the development of policy and programmes for the areas in which they live. The results of conservation and durable use of biodiversity should be based largely on experiences that these groups have acquired throughout the centuries. The Centre for Genetic Resources participates in the Community Biodiversity Development and Conservation programme, managed by non-government organisations, and focuses on the conservation of genetic resources and other forms of agricultural biodiversity by farmers.

2.4 Platform for cooperation

The government intends to expand cooperation with commerce, research and social organisations by means of this policy document. There is an increase in social commitment to finding structural solutions to the loss of biodiversity and ways of achieving sustainable use of genetic resources. For this purpose, a Genetic Resources Platform will be established in 2002. This platform consists of representatives from the business sector, research organisations, social organisations and the government. The Platform will address a number of the issues included in this policy document, such as:

- Strengthening the economic position of The Netherlands concerning the use of genetic resources, with special attention to the role and input of the business world in the agro-food sector and in biotechnology;
- Promoting the development and use of Codes of Conduct that contain the basic principles of this policy document;

- Promoting the development and use of Material Transfer Agreements, with which a prudent exchange of genetic resources can be set up;
- Improving the exchange of knowledge and information via the National Information Centre for Genetic Resources, among others;
- Reinforcing cooperation between The Netherlands and certain selected countries.

3. General frameworks

3.1 Basic principles of framework agreements

One of the Dutch government's objectives is the application of general basic principles and regulations for dealing with genetic resources. The government is responsible for determining general frameworks regarding how to deal with genetic resources. This is mainly achieved by means of international cooperation (see Section 5). The Netherlands is committed to:

- Clarifying the specification of commitments under the Convention on Biological Diversity (CBD) and other conventions on genetic resources. This can be phrased in general CBD guidelines, which will contribute to an alignment of national policy and legislation;
- Implementing the International Treaty on Plant Genetic Resources for Food and Agriculture, focusing on management and utilisation of the main crops in agriculture and food production;
- Specifying the cohesion between the CBD and international agreements on intellectual property rights, primarily as stated in WTO-TRIPS, UPOV and WIPO²;
- Implementing policy, regulations and legislation on modern biotechnology, in particular the Cartagena Protocol on Biosafety.

In its national policy on biodiversity, the Dutch government stated which basic principles it will apply. Detailed by sections, these principles are:

- As a party to the CBD, the Netherlands acknowledges the national sovereignty of countries regarding their genetic resources. The Netherlands fully complies with the obligations under the Convention.
- At the same time, the government strives for national and international open access to genetic material and its exchange, as a means of acquiring knowledge, and achieving the conservation and sustainable use of biodiversity.
- The exchange is to be based on mutual and pre-convened arrangements between the supplier and the receiving party (Prior Informed Consent), conforming with international obligations and taking into account the interests of third parties such as governments, non-governmental organisations, local communities, indigenous populations and the scientific community.
- The exchange will contribute to the conservation, management and sustainable use of genetic resources in countries of origin and should under no circumstances result in the degeneration of biodiversity in those countries.
- The exchange is based on agreements that contribute to a fair benefit sharing of using the relevant genetic material; as such, this will help relieve general poverty in developing countries.
- Local and indigenous knowledge on management and use of genetic resources will be respected, always aiming at a fair benefit sharing.

² World Trade Organization Agreement on Trade-Related Aspects of Intellectual Property Rights (WTO-TRIPS); Union internationale pour la Protection des Obtentions Végétales (UPOV); World Intellectual Property Organisation (WIPO)

- Users of genetic resources must contribute to an open international exchange of knowledge and information on genetic resources, in particular regarding the origin of the genetic material.

The basic principles relate to access and exchange of micro-organisms, plants, animals and reproductive parts such as seeds and grafts. The government acknowledges that it may be necessary to apply supplementary conditions to the access and exchange of other hereditary material, such as DNA fragments, for reasons of security or certain specific rights.

3.2 Legislation and regulations

In The Netherlands, legislation has been introduced to protect important areas in the conservation of genetic resources *in situ*. There has also been legislation on the subjects of intellectual property rights and biotechnology. As the country of origin to only a few varieties or species, the government does not deem it necessary to secure its national sovereignty regarding access and use of these resources in its legislation.

During the next few months, it will be determined whether additional legislation on the subject of genetic resources is necessary. This analysis applies to the full policy as stated within this document. Progress on the application of the policy will be monitored using indicators (see Section 2.2). The fulfilment and application of the agreements made in contracts and codes of conduct will also be monitored.

Any supplementary legislation will be subjected to ratification by the International Treaty on Plant Genetic Resources for Food and Agriculture. Other international developments will also be adopted, such as the specifications of the CBD, developments on intellectual property issues, legislation on biotechnology and plant pathology, and the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES). Developing common legislation and regulations within the European Union will be considered.

The government promotes the development and use of codes of conduct. In the case of unusual transactions with genetic resources, it is very important to obtain concordance beforehand in order to avoid potential conflicts. This is certainly the case when dealing with countries that have introduced detailed legislation. Material Transfer Agreements are an appropriate instrument, so long as they contain the right clauses, such as on the arbitration of disputes.

Many developing countries and some western countries have drafted legislation and regulations on access to genetic resources and their management, often as a result of international agreements. However, the differences between countries are substantial. It is necessary to improve the supply of information on such policies, legislation and regulations. As determined in this document, the government of The Netherlands will publicise its policy via multilateral channels.

With *Sources of Existence*, the government calls on businesses, institutions and individuals to deal carefully with regulations, legislation and policy convened internationally or instituted in other countries. Access, exchange and use of genetic

resources can be based on existing public law regulations, supplemented by alternatives in the sphere of private law.

The government will continue its consultation with interested parties via the Platform for Genetic Resources, among others. The National Information Centre for Genetic Resources will keep track of which codes of conduct and contracts are to be observed, and will function as a guide for institutions. The Centre will also develop models for other instruments that render the basic principles of this policy document. The government will study the possibility of establishing dialogue with a few countries on the development of private and public law instruments for genetic resources.

Brief conclusion on the role of government

This policy illustrates how The Netherlands will approach its international obligations regarding genetic resources. The government will stimulate cooperation between the parties involved on a national level, and will create an infrastructure for the exchange of expertise and information internationally. The application of the policy as determined in this document is mainly the responsibility of the business sector, institutions, researchers and individuals. There are excellent opportunities to base the application on existing legislation, provided that:

1. The use and management of genetic resources in The Netherlands is conducted as openly as possible;
2. Transactions and trade in genetic resources are conducted with care;
3. Each person assumes responsibility for managing genetic resources.

3.3 Details of basic principles

In order to offer a more detailed specification of these basic principles, the Dutch government will especially consider the following three aspects:

The place where the genetic material is managed or used.	In or away from its original location (<i>in situ</i> or <i>ex situ</i>).
The nature of the genetic material.	Microbial, plant or animal.
The purpose for which the genetic material is managed or used.	Non-commercial purposes, primary plant or animal production (in agriculture, forestry or fisheries); or the use in (agro) industrial production processes.

3.3.1 The location of genetic material

Genetic diversity is maintained and used in two separate ways:

- a) "*in situ*" (on location), in the natural habitat of the specific genetic variety. In the case of domesticated or cultivated species, it concerns the habitat in which they acquired their characteristics. These are generally areas extensively used by humans, such as semi-natural forests and traditional agricultural systems;
- b) "*ex situ*", comprises everything outside of the area mentioned above, such as botanical gardens and zoos, fish farms, gene banks for plants and animals, collections of fungi, bacteria, viruses, and others.

3.3.2 *In situ management*

The Netherlands has very few wild relatives of agricultural plants and farm animals. As agro-diversity decreased significantly in The Netherlands during the 20th century, the opportunities for *in situ* management are limited. The main function of *in situ* management in The Netherlands is the conservation and management of a relatively limited number of rare, characteristic plants and animals. Occasionally, these are of great historical and cultural value.

From a nature management point of view, the conservation of traditional grasslands contributes to the conservation of a few cultural species indigenous to The Netherlands. In national forestry, there are still options to strengthen natural processes and subsequently achieve the conservation of characteristic varieties of trees and shrubs. Placing rare breeds of farm animals in nature reserves offers advantages for both nature management and agriculture. Hobby organisations and urban farms play an important role in the conservation of traditional breeds of farm animals, as they offer small-scale alternatives for management *in situ*.

Intensive forms of agriculture and horticulture leave little room to conserve varieties in the current systems. A significant exception is the re-evaluation of high-stem tree orchards from a landscape perspective. Organic agriculture also offers alternatives to reinforce the conservation and sustainable use of characteristic Dutch varieties and breeds *in situ*. There is a great need for breeds that are not dependent on artificial fertilizers and chemical pesticides.

The government supports the multi-functional approach described above and will bear this in mind when considering and applying subsidies or other instruments. This government regulation supports initiatives for the development of local products, the conservation, reinstatement or development of historical cultural values, the maintenance of old local agricultural breeds, and extending the variety of soil life. The initiatives must form part of an integrated, localised approach.

Further local breeding and development of traditional crops and rare breeds of domestic animals contributes significantly to the development of sustainable agricultural systems. The promotion of *in situ* management by developing and commercialising new varieties, may not be reconcilable with existing legislation and regulations. In the case of agricultural crops, it is difficult to obtain the intellectual property rights on newly developed varieties if there is a significant lack of uniformity. A revision of present regulations on the admittance of seed and planting material into the economy is being considered. This revision must take place at an international level, and the European Commission has already taken an initiative in this respect.

The conservation of “wild” genetic resources is best achieved by protecting their natural habitats. In various policy documents, the Dutch government has indicated its preference for a worldwide Ecological Network of nature reserve areas, as a reservoir of genetic variety and a basis for maintaining natural processes.

In developing countries, there is still a huge variety of genetic resources *in situ*. The government of The Netherlands endorses the conservation and use of these very diverse local varieties that were developed by farmers over generations.

3.3.3 *Ex situ management - general*

The government promotes cooperation between institutions managing microbial, plant and animal collections. The National Information Centre for Genetic Resources will support the national and international exchange of information on *ex situ* collections. The government also advocates reinforcing the cooperation between these institutions and universities, particularly the Research School Biodiversity of Dutch universities.

During the closing round of negotiations on the wording of the Convention on Biological Diversity, it was decided that the CBD would not apply to biodiversity collected before the convention entered into force on 29 December 1993. The vast majority of material currently present in collections was collected before 1994. The government aims at an integrated approach based on the CBD. However, the difference is considered to be relevant when determining whether the material was rightfully obtained. As of 1994, it is no longer possible to obtain material from other countries without respecting the basic principles of the CBD. One of the main issues is the need to achieve a fair benefit sharing of the use of genetic resources.

These obligations apply to all genetic resources, including hereditary material such as genes and DNA. The government seeks an integrated approach in this respect as well, generating as many agreements as possible on the level of organisms and their reproductive parts, instead of hereditary material.

3.3.4 *Ex situ management - gene banks*

Based on the obligations under the CBD and other international agreements, the policy is aimed at maintaining the gene banks for agricultural and horticultural crops and farm animals. The gene bank for trees and shrubs will be linked to that for agricultural and horticultural crops. The Fungal Biodiversity Centre remains the collection centre for micro-organisms.

The government will adopt regulations on the management and storage of material in the gene banks (Codes of Conduct) and on its access (Material Transfer Agreements). Additionally, regulations will be adopted on gathering and disseminating information on material stored in the gene banks. The regulations shall be specified in detail according to policy, as determined in this document.

A distinction will be made between:

- genetic material for which the government bears exceptional responsibility, mainly as a result of international obligations; and,
- genetic material with a primary commercial interest, to allow the business sector to take the initiative.

3.3.5 *Ex situ management - working collections*

Temporary collections of genetic resources are usually maintained during research and development of new technologies and/or varieties. These working collections are also subject to the basic principles as determined in this document. After a certain period, these temporary collections are often destroyed for reasons of efficiency. In the long term, the material in the collection could be significant to the development of new varieties or to applications elsewhere. Therefore, owners of working collections are requested to determine which part of their collection is worth keeping and to assist in finding solutions for the management of said collections.

3.3.6 *Ex situ management - botanical gardens and zoos*

Botanical gardens and zoos in The Netherlands value the CBD, exchange plants and animals conscientiously and participate actively in the specification of codes of conduct on an international level. The government is currently drafting the *Code of Conduct for Botanical Gardens in The Netherlands: Compliance with the CBD*. Based on such a code, the botanical gardens will commit to the exchange of material in accordance with the CBD.

The objective is to have as many botanical gardens and zoos as possible applying these guidelines. The government assumes that the gardens supervise compliance with the guidelines and the arbitration of any disputes. The government considers the application and detailed specification of such guidelines important and believes that this will allow the gardens and zoos to provide greater content to the basic principles of this document.

On a worldwide level, The Netherlands will strive for the recognition of such guidelines, specified by legislation and regulations on biodiversity, genetic resources, the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) and intellectual property rights.

4. Sustainable applications

One of the Dutch government's objectives is the promotion of sustainable applications, since this is the best guarantee for the conservation of genetic resources. This includes promoting the sustainability of existing applications as well as developing new alternatives for sustainable use. A distinction is made between:

- 1) Non-commercial use, such as landscape management, scientific purposes, research and knowledge;
- 2) Commercial use such as:
 - a) Primary plant and animal production in agriculture, forestry and fishery;
 - b) Sectors such as process technology, (modern) biotechnology, and pharmacy.

4.1 Non-commercial applications

Non-commercial use of genetic resources comprises:

- 1) Landscape management;
- 2) Scientific purposes, research and knowledge.

Either of these applications may be linked to commercial interests, in which case it will also be subject to the policy for commercial applications as stated in Section 4.2.

4.1.1 Landscape management

The genetic diversity of a great number of plants formerly common in The Netherlands, and of many indigenous trees and shrubs, has decreased due to ongoing selection. The use of indigenous varieties is recommended in the restoration and further development of nature and landscape. Therefore, the original genetic diversity must be conserved. This applies particularly to wood plants such as hawthorn, wild pears and apple trees. The Foundation Bronnen (see Section 4.2.2, forestry) is a semi-commercial institution that knows and uses a great number of these genetic resources. It also has overview maps available showing the *in situ* location of original material.

The wealth of plants and animals at our disposal is part of our cultural inheritance. It is the outcome of the relationship between humans and their environment, often developed over the centuries, which cannot be separated from knowledge and information about the manner in which certain plants or animals were or are being used. Such knowledge is often strongly connected to certain local or native communities. The Netherlands still has a substantial range of characteristic plants and animals, the majority of which are associated with certain forms of agricultural use. Additionally, interest in conservation and the use of genetic resources that are characteristic for Dutch nature and landscape management is increasing. Examples are the increase in rare pet species, the recovery of high-stem orchards and the rebuilding of wooded banks and hedge landscapes.

4.1.2 Science, research and knowledge

The government's view is that the use of genetic resources for the further development of science, research and knowledge should be based on openness and international cooperation. This openness is accomplished by:

- a) Setting up an information network by the National Information Centre for Genetic Resources to determine who is managing which genetic material and where (exclusive DNA information);
- b) Making information, knowledge and expertise on the use of genetic material and on the techniques and technologies employed freely available, particularly if a request is made for the advance of science and knowledge. Preconditions can be set on information based on local and indigenous knowledge and information essential for commercial applications;
- c) An open national and international exchange of material for scientific research and the advancement of knowledge. The exchange of hereditary material, when possible, may be subjected to additional conditions, such as transportation costs, security measures and honouring acquired rights;
- d) Research and scientific institutions established in The Netherlands, active in the field of genetic resources, keeping the National Information Centre for Genetic Resources informed of all national activities taking place that result in a better international image. An example is the active contribution of The Netherlands to the Global Biodiversity Information Facility (GBIF). This facility will ease the exchange of data on biodiversity by linking databases and making them readily accessible.

Where possible, the development of scientific knowledge and research should take place internationally in keeping with the priorities of this document. Institutions in developing countries and central/eastern Europe have inadequate infrastructures and limited capacity. Through bilateral and multilateral programs, the Dutch government will facilitate an increase in the capacity for managing genetic resources (see Section 5) and invites institutions established in The Netherlands to support sister institutions in these countries.

There are opportunities for new research in genetic resources in accordance with the basic principles in the following areas:

- Rendering of new developments (bioinformatics, genomics, biotechnology) into applications using genetic resources, especially in the agro-food sector;
- The economy of gene bank management (more efficient collection; optimised conditions);
- The conservation of agro-biodiversity on farms: strategically investigating the importance of genetic varieties for sustainable farming, the potential for an improved exploitation of locally managed genetic resources, and reinforcing the development and commercialisation of local varieties, particularly in developing countries.

The following priorities will have an impact on the national research programme:

- Bioinformatics (large-scale data analysis, storage and retrieval), genomics (analysis of genetic relations, molecular evaluation) and biotechnology;
- Agriculture, forestry and nature management. The International Cooperation research programme of the Ministry of Agriculture, Nature Management and Fisheries aims to reinforce the economic and ecological function of biodiversity in tropical agricultural areas;
- Fisheries: see Section 4.2.3.

Furthermore, an evaluation will determine whether the transfer of knowledge on genetic resources can be strengthened, for instance via university, other curricula and information services. The government will continue to support the reinforcement of international research on the use of genetic resources in agriculture and food production. The main international channel is the Consultative Group on International Agricultural Research (CGIAR); see Section 5.1.

4.2 Commercial applications

4.2.1 Microbial genetic resources

Making an inventory

Making an inventory of the huge microbial biodiversity is not feasible globally for a number of reasons, including the high costs involved (an estimated six billion dollars). Research on the main groups must be prioritised in terms of the risk of causing disease and plagues (particularly the extra risks involved in globalisation), and in terms of contributions to food production, biotechnology, conservation of ecosystems and scientific progress.

Use of microbial genetic resources

Micro-organisms are an essential factor in many production applications in the (agro-) industry, medicine, agriculture and food. They are increasingly used as biological pesticides and in cleaning up environmental pollution. These applications are possible only if we manage the micro-organisms in a controlled environment and if we can determine exactly how they function. The same can be said of the detrimental effect of micro-organisms on plants and animals in agriculture, forestry and fishery, and of the possibility of an adequate response by means of breeding.

The government encourages international agreements in order to advance free passage of micro-organisms, particularly concerning non-commercial applications. The industry will also participate in these agreements, which will all be based on the principles stated in this document.

When a patent is requested for an invention using a micro-organism that is not publicly available, a culture of the relevant organism must be submitted to an accredited institution. The Budapest³ Convention concluded the necessary regulations on how these institutions will deal with the receipt and storage of micro-organisms and the issuing of samples. Within the framework of this convention, the Fungal Biodiversity Centre (CBS) is the certified depositary and storage facility in The Netherlands. The institute also manages bacterial collections.

Other important collections are those of the National Institute of Public Health and the Environment (RIVM: human pathogens), the Institute for Animal Science and Health (ID-Lelystad), the Royal Tropical Institute, Utrecht veterinary faculty (animal pathogens) and the Wageningen institutes of PD and Plant Research International (plant pathogens). These are important industrial collections associated with the food and pharmaceutical

³ Convention on the International recognition of the deposit of micro-organisms for the purposes of patent procedures (1977)

industry, as well as organisations such as TNO (Netherlands Organisation for Applied Scientific Research) and NIZO Food Research. There are possibilities to strengthen the cooperation between these and similar institutions.

Internationally, the CBS institute represents The Netherlands within the EU projects Microbial Information Network Europe (MINE), Common Access to Biotechnological Resources and Information (CABRI), and the European Biological Resources Centres Network (EBRCN), which was launched in 2001. The Netherlands is also closely involved in establishing a worldwide network of biological resources, in which culture collections and databases will be interconnected. This initiative is conducted within the Organisation for Economic Cooperation and Development (OECD) and should result in the transformation of the CBS into a Biological Resource Collection.

Microbial genetic resources in an international perspective

The Netherlands is an important centre of microbiology knowledge with globally outstanding scientific research and a leading role in the food and pharmaceutical industry. Consequently, access to microbial genetic resources is crucial and the CBS is its focal point. The institute will determine the specific strength of the Netherlands regarding research and the use of microbial genetic resources on an international scale. Subsequently, the government will consider the options for reinforcing the position of the Netherlands in close cooperation with all parties concerned. It will also consider increasing national contributions in the field of conservation and use of micro-organisms, should developing countries request this.

This will further specify the agreements of the OECD on creating an international network of Biological Resource Centres. A close collaboration between CBS and other important Dutch collections is vital. The government will therefore reinforce the Netherlands Culture Collections of Micro-organisms, established in 1992.

4.2.2 Plant genetic resources

Plant genetic resources includes a myriad of issues. However, in this document we would like to highlight only the most prevalent and important subjects:

- Agriculture and food production – participating in programmes;
- Forestry;
- Ornamental plants;
- Medical purposes.

Agriculture and food production – participating in programmes

Although developing countries contain most of the earth's genetic resources, they have insufficient means for managing the resources due to poverty. In addition to management of the multilateral system, funds will be deployed to support these countries in increasing their capacity for managing and using genetic resources. The principal aim is supporting farmers and traditional communities in the conservation and further development of varieties adapted to local conditions.

Those bringing a product into the market (such as a new variety) with the help of genetic material from the multilateral system should pay a user fee if this results in limited

access to the original material for further research and breeding. This applies to the acquisition of a patent but not to that of a plant breeders' right. In the latter case, use of the new variety remains available to everyone. This complies with the wish of developing countries to benefit financially from the use of genetic material that originated in their territory.

International cooperation is therefore essential due to the existing interdependency regarding starting material for agriculture. The Netherlands is one of the 34 participants of the European Cooperative Programme on Plant Genetic Resources (ECP/GR), working towards one cohesive policy on conservation and sustainable use of genetic resources. The Programme comprises of a number of technical groups, including the Centre for Genetic Resources, The Netherlands (CGN).

The FAO Global Plan of Action of Plant Genetic Resources for Food and Agriculture (1996) constitutes the basic principle of the approach, on a national scale, to plant genetic resources for agriculture and food production. In addition, the conservation and the advancement of genetic resources of crops and farm animals (see Section 4.2.3) have been transferred to the CGN.

The Netherlands will renew its efforts to achieve a speedy ratification and implementation of the International Treaty on Plant Genetic Resources for Food and Agriculture, which was adopted in November 2001 as a revision of the 1983 version. This treaty stipulates rights and duties for the management and use of the main collections of starting material for agriculture and food production. There will be free access to these collections for use in research, training and breeding. Consequently, the collections will be stored in a multilateral system, including the collections managed by the Consultative Group on International Agricultural Research. For implementation of the treaty, The Netherlands will continue to advocate a close collaboration between the FAO, the CBD and the CGIAR (see Section 5).

Funding for the implementation of the treaty will be created by re-prioritising current national and international channels. The government expects contributions from the private sector, since companies benefit from the maintenance of genetic material in the multilateral system. These contributions are appropriate within the framework of fair distribution of the commercial profits derived from using material provided by the multilateral system.

Since the orientation of Dutch breeders and exporters is international, the country requires optimal international cooperation for further export development. Therefore, it is to the Dutch business sector's advantage to approach the basic principles of this policy document constructively. The government will insist on securing these principles in Codes of Conduct and Material Transfer Agreements in its consultations with the sector.

The Dutch business sector owns collections of plant genetic resources that are important from an international point of view. Close cooperation has always existed between plant breeders in exchanging starting material for research and breeding. The exact location of each collection will be included in the database of collections present in The Netherlands, which is currently being compiled by the National Information Centre for Genetic Resources.

The conservation of older breeds and traditional crops on the farms, by hobby breeders or allotment gardeners, makes an important contribution to the conservation of crop diversity. This is certainly the case for older varieties of vegetables and fruit, and for traditional vegetable crops. Recently, the management of a collection of old apple varieties was added to CGN. As stated in Section 3.3, possibilities will be researched to facilitate the breeding of such crops and to remove any constraints resulting from regulations on admittance into the market.

Forestry

There is an urgent need to take action in the immediate future with respect to trees, shrubs and their associated genetic resources in The Netherlands. The reason for this is the rapid disappearance of indigenous gene material. Between 1992 and 1997, systematic research into the distribution of indigenous gene material in trees and shrubs was carried out across the entire country. The results showed that the majority of Dutch trees and shrubs of indigenous origin were exceedingly rare. Within The Netherlands, some species are only represented by a few individual specimens. Presently, planting trees and shrubs is often done with material of a small genetic base, often derived from central or southern Europe.

For the development of the national ecological network – especially the stimulation of sustainable forestry – and for laying out new forests, there is a major short-term demand for indigenous base material. This demand increased with the awareness that indigenous trees and shrubs are elementary for the development of smoothly functioning ecosystems. There is an increasing trend among councils and Water Boards to plant indigenous trees and shrubs.

Varieties of trees and shrubs evolve more favourably in their natural habitat (*in situ*). Consequently, the management of forest areas and nature reserves, both in The Netherlands and abroad, should focus on characteristic or native genetic resources. When this is not possible, for example because the populations have decreased to such an extent that they can no longer be maintained without assistance, the best solution is to preserve them in gene banks (*ex situ*).

In 1998, the Foundation Bronnen (www.bronnen.nl) was commissioned by the government to draw up a plan for a gene bank and seed garden for approximately 50 species of native trees and shrubs, in collaboration with the National Forest Service of The Netherlands, Plant Research International and Alterra. The National Forest Service has offered to provide land in the province of Flevoland and manage the gene bank, provided that the additional costs incurred are reimbursed. Said management will be based on the policy and basic principles of this document. The creation and management of the gene bank and seed garden will start soon, supported by a government backing of approximately three million euros. A similar proposition has been presented in Flanders, Belgium. Consequently, there will be close collaboration with the regional authority of Flanders and the possibility of co-financing from EU funds will be examined.

Internationally, research into genetic resources is supported and, as far as the Consultative Group on International Agricultural Research (CGIAR) is concerned, coordinated by the International Plant Genetic Resources Institute (IPGRI). The work

regarding trees and shrubs is part of the European Forest Genetic Resources Programme (EUFORGEN), in which The Netherlands actively participates. The gene bank for trees and shrubs will be part of the international knowledge network in which these organisations cooperate, as is the case for the agricultural crops gene banks.

The Netherlands will continue to request the FAO to pay more attention to the conservation and sustainable use of native trees and shrubs and in the management of forests and rural areas. This is considered to be feasible due to the integration of existing programmes and projects, in addition to the role of the IPGRI.

Ornamental horticulture

The Netherlands is an important exporter of ornamental plants, with an international reputation and leading position in distribution and breeding. Many ornamental plants bred in the Netherlands originate in other countries. The collection of supplementary genetic material abroad must take place in compliance with the policies, regulations and legislation of the country in question. At the same time, the government exhorts the business sector to comply with the basic principles stated in *Sources of Existence*, for example by employing Codes of Conduct and Material Transfer Agreements.

The most famous Dutch export product is the tulip, of which the Hortus Bulborum in Lisse maintains an important collection. With the support of the Ministry of Agriculture, Fisheries and Nature Management, CGN has managed to conserve properties of an important lily collection by storing seed. Companies supply additional funding for the conservation of Dutch lilies in the form of living plants.

For the business sector, plant collections managed by CGN can play an important role in the conservation of genetic diversity relevant to breeding ornamental plants. The financial consequences are the responsibility of the business sector, leaving the government to address the issues of policy and strategy.

Every country has a right to a fair benefit sharing of the use of genetic resources that are theirs by sovereign rights. Although this principle does not apply retroactively to material collected before 1994, the government exhorts the Dutch business sector and researchers to promote maximum transparency regarding the nature of the material concerned and to cooperate with the country of origin. This will reinforce the reputation of ornamental plant breeders in The Netherlands.

Medical purposes

The healing power of many drugs is based on substances derived from plants. As drugs have mainly been produced industrially in recent decades, using various biotechnological applications, the use of wild or agricultural plants has often been unnecessary. Opinions differ as to our dependence on *in situ* genetic resources for the development of new drugs. The search for medicinal plants *in situ* is of great (commercial) significance, as shown by contracts between pharmaceutical companies and institutions in developing countries, such as Costa Rica. In addition, many use plant extracts for the prevention and cure of illnesses worldwide.

The government deems it imperative that the basic principles of this document be applied to the use of genetic resources for medicinal purposes. It considers it essential that countries with a significant pharmaceutical sector, such as Switzerland, endorse the conservation and sustainable use of genetic resources of medicinal value. It will be examined how dissemination of this information can be improved in the Netherlands.

4.2.3 *Animal genetic resources*

Animal genetic resources includes a myriad of issues. However, in this document we would like to highlight only the most prevalent and important subjects:

- Farm animals;
- Fisheries;
- Insects.

Farm animals

Countless breeds are in danger of becoming extinct all over Europe. Therefore, cooperation to conserve farm animals has intensified in the last few years. The FAO and the European Association for Animal Production (EAAP) coordinate the recording of information and statistics on European breeds, making scientific information accessible to managers and users of animal genetic resources.

With financial contributions from, among others, The Netherlands, a European Regional Focal Point was established. This coordinates the approach of individual countries to the conservation and sustainable use of animal genetic resources, and supports the exchange of knowledge and information.

A number of guidelines exist within the EU to support activities aimed at the management of farm animals. In addition, the government will encourage further research on farm animals in the course of research programmes for agriculture and biodiversity.

The main issues for The Netherlands are:

- The role of farm animals in multi-functional agriculture, including the cultural-historical, recreational and educational significance;
- The relationship between genetic erosion and animal diseases.

In the latter case, the issue is how to make animals more resistant to diseases, and determining the scale of the effect of genetic diversity/uniformity in animal populations. However, increasing animal resistance cannot prevent the outbreak of highly contagious diseases such as Foot and Mouth.

A global strategy will be developed for genetic resources of farm animals, under FAO coordination. The objective is to obtain a global overview and to incite the conservation and management of variety in farm animals. The Netherlands will continue to contribute to this effort in various ways, such as international cooperation and adopting a strategic national approach.

The Netherlands advocates assisting developing countries in the use and further development of their breeds of farm animals, in coordination with the FAO. Their access

to **livestock** specifically adapted to their local conditions is vital to world food production. In addition, these countries face the challenge of meeting the growing demand for animal protein, resulting from a population increase and the diverging consumption patterns in many developing countries due to an increase in wealth.

National documents will form the basis for the formulation of a global strategic plan of action. The FAO invited every country to draft such a document and remit it by June 2002. The Dutch document will be ready this year, under the supervision of the Ministry of Agriculture, Nature Management and Fisheries and in consultation with the Institute for Animal Science and Health in Lelystad. This institute operates as "National Focal Point" for the FAO and works closely together with the National Information Centre for Genetic Resources. A core group, which includes the business sector, The Foundation of Rare Domestic Animal Breeds (SZH) and nature and landscape management, will be involved in drafting the document.

As stated in Section 3, the gene bank for farm animals is still in development. Animal genetic resources are mainly collected within the private sector. Consequently, conservation and management of farm animals can only succeed if the agriculture and food production sector assumes its responsibilities. As in the case of microbial and plant genetic resources, the government exhorts the sector to apply the basic principles of this document in the form of Codes of Conduct and Material Transfer Agreements.

Conservation of animals *in situ* is preferable, particularly in cases where specific breeds are endangered. Animals are easier to manage in their natural habitat and the breed can continue to develop. In the case of small populations, intervention is necessary to avoid inbreeding.

When conservation of the agricultural situation is no longer feasible, the possibility of *ex situ* conservation elsewhere must be examined first. The method of preference is *ex situ* management in the field. The government will continue to promote the use of rare breeds of domestic animals in nature management. SZH plays an important role in promoting the conservation of farm animals native to The Netherlands. Hobby breeders and urban farms also contribute to the conservation of many rare farm animals and their activities are highly significant in a cultural-historical and educational context.

Fisheries

The attention on genetic diversity within and between fish species is quite recent in fisheries, particularly compared to agriculture and forestry. This is because most fishing takes place in open waters and human control of fish development is relatively limited. Knowledge does exist at the species level, particularly of the ones that are commercially relevant in the marine environment. There is significantly less worldwide knowledge of the diversity in inland waterways, coral reefs and deep seas. The government regards this as a disadvantage and recommends a focus on the variety of species and genetic diversity of fish in any current, relevant research programmes.

There is still very little consideration for genetic variety within target species. It is important to investigate the negative impact of uniform pressure via fishing on the genetic development of populations, since it may affect genetically determined traits such as seasonal migration and reproduction rates. It is also unknown how genetic

diversity in natural populations could be optimally used in order to achieve sustainable fishing methods. The government will request an inventory of knowledge and information on the relationship between genetic diversity of wild fish populations and sustainable fishery methods, compiled by the National Institute for Fisheries Research (RIVO) and the National Institute for Coastal and Marine Management.

All inland waterways are subject to the sovereign rights of a particular country. Consequently, the conservation and sustainable use of the biodiversity they contain must be approached in the same manner as ecosystems on land. The government considers that the exchange of genetic material in fisheries and aquaculture must take place freely, as in the case of agricultural genetic resources (see relevant sections in this document). The Netherlands invites European countries and the FAO to consider these issues and to formulate concrete, international agreements where this basic principle is acknowledged and detailed.

National sovereignty rights do not apply to genetic resources found outside territorial zones. Those fish populations are the joint responsibility of all countries and it is only appropriate that the genetic resources be exchanged freely. The government considers the general basic principles and objectives, as stated in Sections 2 and 3, applicable to the management and use of genetic resources within the territorial zone. The distinction between this coastal strip and the open sea is often arbitrary or irrelevant to fish populations. There can be exceptions, such as the case of endemic coral fish, where The Netherlands acknowledges the application of a country's sovereign rights, for example on the harvesting and trade of ornamental aquaculture.

Another government consideration is restraint regarding patents for fish genetic resources, although with consideration for existing frameworks for intellectual property rights to living material (see Section 5).

If aquaculture takes place in open waters, it can have a substantial effect on the natural system due to the dissemination of relatively high concentrations of fish parasites, fertilisers and chemicals. The escape of bred fish and their displacing and/or mixing with wild populations can have a significant impact on those wild populations. There are indications that particularly salmon fish farms have a negative impact on wild salmon populations. It is advisable to develop aquaculture in closed systems, with the necessary preconditions for preventing the fish from escaping into the surface water and with sufficient consideration for the welfare of the fish.

An important issue is how to deal with the substantial need for fish food. The government is of the opinion that the negative effects of aquaculture in open waters should be a factor when making decisions on licenses, and that measures must be taken to reduce the damaging effects on existing systems. The Netherlands will raise this point with the FAO and the International Council for the Exploration of the Sea (ICES), on a European and global level.

The government will encourage dialogue and debate on the importance of sufficient consideration for the management and sustainable use of fish genetic resources in The Netherlands. The government invites the Dutch sector to make joint agreements on the specification of this document's basic principles.

Dutch aquaculture is presently limited to farming a small number of sweet water fish species (such as trout, eel, catfish, tilapia) and turbot as a saltwater fish. This is mainly realised using indoor closed systems in an almost industrial manner. Only trout is occasionally farmed in (closed) ponds, as is the case in other countries. Aquaculture does not depend on nature, except in the case of the eel. Eel farming is still based on fishing for elver in nature.

Insects

In agriculture, insects are used to fertilise plants and to control pests. They are a good alternative to less environmentally friendly methods, such as chemical pesticides.

In The Netherlands, specialised companies maintain collections of certain insects such as *Aphelinus mali* and predatory mite. Scientific institutes also maintain working collections, although this generally occurs only during periods in which the relevant insect collections are required for conducting research. In addition, important permanent collections of the fruit fly (*Drosophila*) exist. These are used for research and education. The bee collections in The Netherlands are of economic importance. In general, insects that pollinate flowers are of great economic value.

Presently, no clear overview is available of the number of insect collections present in The Netherlands or of their value, including in an international perspective. The National Information Centre for Genetic Resources will make a summary of the collections present in The Netherlands. The Ministry of Agriculture, Nature Management and Fisheries will conduct an exploratory study of the value of such collections and the need for support in their management. This will provide a view of potential applications of insects to sustainable production.

5. International Cooperation

One of the objectives of the Dutch government is to reinforce national and international cooperation, paying attention to fair benefit sharing. The Netherlands will continue to promote international cohesion through various international forums and correlation of national and international approaches to genetic resources. The sections are:

- Multilateral cooperation;
- The European Union;
- Bilateral cooperation between countries.

5.1 Multilateral Cooperation

Convention on Biological Diversity

The CBD is the main international framework for reaching agreements on the management of genetic resources, along the lines stated in Sections 2 and 3. The Netherlands aims to commit these agreements to paper, in the form of guidelines, during the 6th Conference of Parties to the Convention on Biological Diversity.

The Convention also provides opportunities to improve the exchange of information on policy, legislation, management and the use of genetic resources. In the context of this Convention and other international forums, the government insists on cooperation between international organisations and conventions active in the field of genetic resources.

The Food and Agriculture Organisation of the United Nations (FAO)

The Netherlands will continue to insist on further development of cooperation between the CBD and the FAO regarding genetic resources, agro-biodiversity, forestry and aquatic ecosystems. It will also advocate reinforcing the integration of conservation and sustainable use of genetic resources, particularly *in situ*, in the policy and programmes of the FAO.

In addition, The Netherlands advocates reinforcing specific programmes for genetic resources and increasing the necessary funds. The Dutch contribution to the FAO, under the terms of the partnership programme, will be used to strengthen the FAO's focus on conservation of genetic resources *in situ* as an element of agro-biodiversity.

The EU considers that the FAO must make a substantial contribution towards the implementation of the International Treaty on Plant Genetic Resources for Food and Agriculture in the form of manpower and funds (see Section 4.2.2.).

Consultative Group on International Agricultural Research (CGIAR)

The government values the CGIAR's contribution to the management and sustainable use of genetic resources in developing countries. It has the following objectives regarding these resources:

- A demand-driven approach to research and reinforcing the role of national gene banks and research institutions, particularly in developing countries;
- Reinforcing regional cooperation regarding managing genetic resources;

- Encouraging an integrated and system-wide approach within the CGIAR aimed at promoting the conservation of genetic resources for sustainable agricultural and food production, and the development and application of guidelines for the management of genetic resources, including issues of intellectual property. The current CGIAR Policy Committee may play a leading role in this respect;
- More consideration to conservation and sustainable use of genetic resources *in situ*, particularly where farmers in developing countries use rare local varieties or varieties that are significant to the development of sustainable agriculture and food production;
- Free access to genetic resources managed by the CGIAR. CGIAR institutions claim no intellectual property rights to their material or innovations, unless this is necessary to ensure open access to genetic resources.
- Active support in the application of the International Treaty on Plant Genetic Resources for Food and Agriculture from the CGIAR, and storing all Future Harvest Centre collections of plant resources in the corresponding Multilateral System;
- Reinforcing the financial basis for managing the Centres' collections, preferably linked to current funding mechanisms, such as the one for the International Treaty on Plant Genetic Resources for Food and Agriculture.

Partly based on the above aims, the government will contribute core funding to the CGIAR and Future Harvest Centres. In addition, the government will encourage adherence to these aims by institutions active in agricultural research and management of genetic resources in The Netherlands, such as Wageningen University and Research Centre. The effort of The Netherlands regarding the CGIAR will be coordinated with European partners within the European Initiative for Agricultural Research for Development (EIARD) and with other CGIAR donors. The Dutch government annually contributes approximately 18 million euros to the budget for development cooperation, in particular to the environmental and research programmes.

Organisation for Economic Co-operation and Development (OECD)

The government believes that the OECD's strength regarding genetic resources lies in:

- Promoting alternatives to reinforce the economic relevance of genetic resources and addressing the issue of finding the right balance between public and private law instruments (see Section 3.2);
- Encouraging international cooperation regarding knowledge and information on micro-biological genetic resources (see Section 4.2.1);
- Including genetic resources in OECD-related activities, such as in sustainable agriculture, biotechnology and the development of indicators and Codes of Conduct for the business sector.

Trade

There is a commitment to clarify and reinforce the coherence of multilateral agreements on genetic resources within the framework of the CBD, FAO and the international trade regulations of the WTO. It concerns all relevant aspects of genetic resources in relation to the environment, sustainable development and intellectual property. Clarifying this cohesion, with guidelines for example, will contribute to the alignment of national legislation and regulations on genetic resources.

Intellectual property

The Netherlands considers that the protection of plant breeders' rights is important to all countries. It endeavours to attain acknowledgment of the Union internationale pour la Protection des Obtentions Végétales (UPOV) as one of the effective *sui generis* (independent) systems of protection for plant varieties within the TRIPS Agreement.

The UPOV was explicitly qualified as one of the systems instead of the standard system, allowing countries the opportunity to develop other systems. However, discrepancies between a novel system and the principles of the UPOV system can obstruct trade and the exchange of starting material. Within the UPOV framework, the government will seek solutions compatible with the basic principles of this policy document.

The Netherlands considers that international obligations regarding intellectual property, trade, agriculture and biodiversity are mutually reinforcing. The government will insist on intensifying cooperation between international bodies active in these areas.

During national and international discussions on the connection between biodiversity and intellectual property, The Netherlands will promote a distinction in intellectual property aimed at the adequate protection of:

- Innovations in genetic resources, with a distinction between microbial, plant and animal genetic material. In 1998, The Netherlands objected to an EC guideline that protects biotechnological inventions (98/44/EC), because of the far-reaching possibilities for patenting plants and animals. On 9 October 2001, the European Court of Justice rejected the Dutch appeal for annulment. The Netherlands is now obliged to implement the guideline;
- Technologies for primary use of biodiversity, such as agriculture, forestry and fishery methods and industrial applications;
- Development in knowledge, research and the gathering of information on biodiversity.

In evaluating the provision of the WTO-TRIPS regarding an effective *sui generis* system for the protection of plant varieties, The Netherlands considers the interests of Dutch breeders as well as those of developing countries. Partially through the EU, the government insists on activities aimed at reinforcing capacity in developing countries. This will serve to achieve an adequate specification of international agreements on intellectual property in relation to genetic resources, based on the WTO, United Nations Conference on Trade and Development (UNCTAD), UPOV and the World Intellectual Property Organisation (WIPO)

5.2 European Union

EU countries are collectively working on the further development and implementation of policy, legislation and regulations on genetic resources. In addition, the EU adopts a joint stance during multilateral assemblies based on intensive prior consultation in Brussels. Based on the policy stated in this document, The Netherlands actively

contributes to the development of a joint EU approach to conservation and sustainable use of genetic resources. The focal points will be:

- Reinforcing coherence of policy and regulations within the EU and in EU efforts within multilateral forums;
- Integrating the sustainable use of genetic resources into the Common Agricultural Policy and Common Fisheries Policy, based on the Biodiversity Action Plan for Economic and Development Cooperation;
- Developing a joint approach to accessing genetic resources and a fair benefit sharing, including a study of potential EU regulation;
- Maintaining and reinforcing alternatives for supporting research and measures for the conservation and sustainable use of genetic resources.

These points are specified in detail in various parts of this document.

5.3 Cooperation with other countries

The government acknowledges that developing countries are at a particular disadvantage regarding information, knowledge, expertise and capacity concerning genetic resources. In the form of compensation and financial support for developing countries, it is possible to increase the contribution of The Netherlands towards a fair sharing of the profits from the use of genetic resources. This approach is outlined below. The final point that will be addressed is cooperation with a few selected countries.

It is important to mention that the presence of genetic resources, as well as information, expertise and institutional development, vary tremendously within and among developing countries and central and eastern European countries. This highlights the need for these countries to indicate on which issues they want to cooperate with The Netherlands.

Exchange and accessibility of information

The government considers openness is possible and essential regarding the collections of genetic materials and relevant information, although it must, of course, allow for situations where strict secrecy is required. The Netherlands advocates acquiring an integrated international picture of current collections of genetic material and of *in situ* material of vast actual or potential applications.

The government will encourage as much openness as possible concerning information on the material itself (the so-called passport details), obviously in compliance with any acquired rights on the material in question.

This also applies to information on the origin of the genetic material, particularly if it comes from abroad. There will be special attention for material from centres of origin, i.e. areas that can be considered as the origin of certain species, breeds or varieties, and from areas where the material continues to develop into novel genetic diversity. The Netherlands aims to make this information standard and internationally accessible. This can be achieved by means of voluntary agreements between the parties involved.

Starting points are: general information on collections, Material Transfer Agreements, the application for and granting of intellectual property rights, and giving notice of the

commercialisation of new varieties and products. The government will consider the need for further statutory agreements if, after a number of years, it is apparent that information was not kept up to date and it is difficult to confirm whether the obligations resulting from international agreements have been fulfilled (see Section 3.2).

Empowerment and support for developing countries

Developing countries must be empowered to state their own priorities and have direct control of the means contributed by donors. It is advisable for The Netherlands to invest in supporting developing countries to increase their capacity for managing and utilising genetic resources. This concerns scientific and technical knowledge, scientific research, technological transference and improving institutional capacity (material, such as housing and equipment, and immaterial, such as management skills).

The priorities of developing countries form an important aspect regarding the financial contributions of the Dutch government, such as for the CGIAR. Based on these issues and needs of developing countries, the government is of the opinion that Dutch holders of resources and users of genetic material, expertise institutions and biotechnology companies have a vital task. This task may entail:

- a) The exchange of information and knowledge;
- b) Supporting the development of expertise in these countries and joint ventures, such as the CGN support in the development of a national programme for genetic resources in Bhutan.

In the Integrated Policy Document on Biotechnology, September 2000, the government indicated that The Netherlands encourages research on the alternatives provided by gene technology for food crops in developing countries.

Conserving traditional knowledge

The conservation of traditional knowledge of native and local groups requires particular attention. Based on WIPO and the work programme for native groups under the CBD, The Netherlands will observe the following basic principles:

- The Netherlands considers it necessary to develop a documentation system of traditional knowledge in order to prevent its loss. A number of countries, such as India and Peru, have already made a start. These systems can also be used to assess applications for intellectual property rights, since knowledge in the public domain cannot be patented. Another advantage of proper documentation is its assistance in determining which parties should be involved in the fair benefit sharing from the use of genetic resources and other related knowledge. The creation of an international network of acknowledged documentation systems is advisable.
- Collaboration between native and local groups, the private sector, non-governmental organisations, governments and scientists must be reinforced. Improper use of traditional knowledge must be discouraged and, more importantly, a joint search made for innovative ways of respecting and exploiting traditional knowledge in the conservation, management and sustainable use of genetic resources. There have been cases where native and local groups negotiated contracts with the private sector for the use of their knowledge and the genetic resources in their management.

- There are different views on the need and the possibilities of protecting knowledge under the current regulations on intellectual property. The government is of the opinion that native and local groups should state if they wish to make use of relevant intellectual property. The cabinet has expressed the opinion that the existing regulations may contribute towards full acknowledgement of the significance of traditional knowledge to management and sustainable use of genetic resources. The existing framework allows opportunities to, for example, develop *sui generis* systems, and enforce the acknowledgement of trade secrets and the collective management of intellectual property. The WIPO offers legal and technical assistance, such as education and training in application methods of intellectual property, to both countries and groups.
- The Netherlands is in favour of exploring the possibilities for adaptation if current regimes for intellectual property prove to be insufficient. After all, intellectual property is dynamically linked to new developments in society.

Collaboration with selected countries

The government will work more intensively with a number of countries in the field of genetic resources. Developments in this policy area are in full progress. The basic principles of this policy document apply equally to the bilateral cooperation with other countries, between governments as well as social organisations and the business sector. Policy, legislation and regulations must be aligned with actual practise and vice-versa. A joint effort towards further development of Codes of Conduct and Material Transfer Agreements is advisable.

The 4th National Environmental Policy Plan (NEPP 4) states that The Netherlands is prepared to cooperate with countries adhering to the Sustainable Development Agreement (March 1994), i.e. Costa Rica, Bhutan and Benin, in the development of Codes of Conduct and in finding the appropriate form of compensation.

In consultation with the parties involved in The Netherlands, the government will examine which countries are eligible for the reinforcement of bilateral cooperation in the field of genetic resources. The choice will be based on mutual, bilateral interest in research, agriculture, nature management, trade and development assistance. There are plans for a cooperative programme, starting with three developing countries and one country in central and eastern Europe, preferably countries with which The Netherlands already has cooperation agreements on related topics. Stakeholders in the Netherlands will be asked to make an active contribution to this cooperation. The possibility of setting up a joint incentive fund to stimulate cooperation activities will be evaluated.

Compensation

In addition to a better exchange of information and improvement of capacity, the government considers that additional compensation is required in many cases in order to achieve a fair benefit sharing from the use of genetic resources. This additional compensation may be financial, or in the form of agreements on profit-sharing, etc. In principle, compensation should be based on an analysis of the transactions and processing of genetic material between resource holder and user. The government advocates the development and use of standard Material Transfer Agreements.

In practice, it will be extremely difficult to objectively determine what the benefits are of using one specific accession or comparable homogenous unit of genetic material. An individual success would not provide appropriate criteria for a distribution formula for all parties involved, such as the original supplier, the owner/manager and the intended user. Even when this analysis is viable, the costs may exceed the returns.

The government does not see a reason to waive compensation and will advocate the use of alternatives for reaching generic agreements on actual compensation, such as the funding mechanisms for the International Treaty on Plant Genetic Resources for Food and Agriculture. Other alternatives worth considering are generic levies on transactions and forms of collaboration between the private and public sector.

6. Conclusion

Genetic resources are part of the entire biological diversity. They concern all material containing the hereditary building blocks for animals, plants and micro-organisms, with an actual or potential value to humanity. Many plant and animal species are considered endangered. Therefore sustainable use is of vital importance. Governments have an essential task in creating frameworks and legislation to guide the management of genetic resources.

The Netherlands holds a leading position in the export of seeds and breeding material for agriculture and livestock breeding. The Netherlands is an important centre of microbiology knowledge with globally outstanding scientific research and a leading role in the food and pharmaceutical industries. Developments in the use of genetic resources are likely to have a tremendous influence during this century. In that respect, genetic resources also have a substantial economic value.

The Dutch government's main objectives can be described as:

- Conservation and sustainable use of genetic resources;
- Fair distribution of the benefits resulting from their use.

These main objectives will be achieved deploying four strategies:

- Applying general basic principles and regulations;
- Conserving genetic resources;
- Promoting approaches for the sustainable use of the resources;
- Reinforcing national and international cooperation focused on a fair distribution of the profits resulting from the use of these resources.

The National Information Centre will provide a better overview of those holding collections of genetic resources in The Netherlands and the genetic material in those collections, as well as field resources of national or international relevance. The Netherlands hereby contributes to the global accessibility of information on genetic material.

A Genetic Resources Platform was established in 2001. This platform consists of representatives from the business sector, research organisations, social organisations and the government.

A number of international agreements have been signed, arranging, for example, for access to genetic material, benefit sharing and exporting issues.

Although a fair number of agreements, legislation and platforms have been created, there is still a substantial amount of issues that will need to be addressed in the near future. The Conference of the Parties to the CBD (COP-6, The Hague, April 2002) will help continue the efforts to create an organised, successful framework for dealing with genetic resources.