Federal Ministry for the
Environment, Nature Conservation
and Nuclear Safety

Federal Government Report under the Convention on Biological Diversity

National Report on biological Diversity

Federal Environment Ministry

Imprint

Published by:
Federal Ministry for the Environment, Nature Conservation
and Nuclear Safety
P.O. Box 12 06 29
53048 Bonn
Germany
E-Mail: oea-1000 @ wp.gate.bmu.de
Internet: http://www.bmu.de

Printed by:
Neusser Druckerei und Verlag GmbH, Neuss

As of:
March 1998

Contents

Summary

The global decline in biological diversity, i.e. the loss or impairment of habitats, species and genetic variety within species, is leading to a frequently irreparable impoverishment of nature and might undermine the very foundations of humankind's future existence.

The Convention on Biological Diversity, which has been signed by more than 170 States and by the European Community since the 1992 United Nations Conference on Environment and Development, is designed to reverse this trend by improving the conservation and sustainable use of biological diversity.

The German Federal Government played a major part in establishing the Convention, which marks an important milestone on the path to a global policy of conservation of biological diversity, sustainable use of its components and the fair and equitable sharing of the benefits arising from the utilisation of genetic resources.

The present report documents the efforts of the Federal Republic of Germany to achieve the objectives of the Convention. This report is submitted in compliance with the obligation pursuant to Article 26 of the Convention itself and is in keeping with the decisions of the second and third conferences of the Parties in Jakarta in 1995 and Buenos Aires in 1996 respectively.

Over the last 50 years the development of nature and the countryside in Germany has been characterised above all by changes in land use as a consequence of economic growth since World War Two and by forms of utilisation and patterns of consumption that have, in part, led to the habitats of wild animals and plants being destroyed, fragmented, reduced in size and degraded and also to the disappearance of species. We have not yet succeeded in halting these processes in their totality.

The task therefore remains one of implementing this agreement as effectively as possible in a country as highly industrialised and densely populated as the Federal Republic of Germany. Germany also bears a large part of the responsibility for implementing the Convention at international level, since our country is one of the world's nations that make considerable use of the biological diversity that exists beyond their own borders. The Federal Government attaches great importance to the Convention on Biological Diversity.

Some of the basic conditions already exist in Germany for achieving the objectives of the Convention:

- Environmental protection in Germany has attained a high standard, especially with regard to policy on cutting pollutant emissions, although the impacts on some ecosystems, especially forest ecosystems, are still too high.
- The sustainable use of forests in Germany has been subject to statutory regulation for over 150 years. Strategies for integrating the concept of sustainable use have also been put into place wherever components of biological diversity are being utilised by humankind (cf. Chapter 3).
- A varied and powerful set of legal, institutional and organisational instruments exists for the implementation of these strategies (cf. Chapters 2 and 5), based on the following basic precepts: the principle of precautionary action, the polluter-pays principle and the principle of cooperation.

Our task is to make more effective use of these existing prerequisites by improving coordination and cooperation. The report presents strategic recommendations (cf. Chapter 4) on how to achieve more effective cooperation on the implementation of the Convention at the political level in the Federal Government and the *Länder.*

1. Introduction: The Convention on Biological Diversity: a new way of looking at the conservation and use of biological diversity

This chapter explains why biological diversity is important for Germany. It discusses the Convention and Germany's obligation to comply with its provisions and outlines the aim of the National Report.

Following the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992, the concept of "biological diversity" became the subject of an agreement under international law, namely the Convention on Biological Diversity. Biological diversity refers to the variability among living organisms of all origins. It comprises both the diversity of ecosystems and of species as well as the genetic variety within species.

Significance of biological diversity for Germany

Biological diversity, comprising all these three aspects, is an essential requirement for continued human existence, even in an industrialised country like Germany. Moreover, it is not just the biological diversity that exists within Germany's borders that is important for the people of our country. On the one hand, through its international commercial relations Germany utilises components of biological diversity beyond its own frontiers. On the other hand, biological diversity within Germany is also being impaired by external influences. The most important benefits of biological diversity for Germany are:

- Biological diversity is crucial to the availability and regeneration of clean environmental media such as soil, water and air. For example, the micro-organisms inhabiting the soil are a key factor in the cycle of elements and substances in nature. A change in the biological diversity of soil life can endanger the ecological functions of the soil.
- Without sufficient diversity of cultivated plants and varieties as well as domesticated animals it would not be possible to guarantee permanent provision of a healthy and varied diet in Germany or anywhere else. This applies both to products that are made in Germany and to those that have to be imported.
- A considerable proportion - approaching 50% - of medicines used in Germany depend on the use of active ingredients of plant and animal origin. In the medicinal herbs and plants sector alone, Germany is the world's third largest importer, after Hong Kong and Japan.
- A large number of renewable raw materials - products of biological diversity - are widely used in all areas of our lives, ranging from the variety of different woods to the plant products used in textiles or technical applications as well as animal products like wool and leather.

Ceral growing

Medicinal plants, here purple coneflower

- Natural, semi-natural and often species-rich habitats perform important functions as recreational areas for the population. For Germans, travel is one of the most important leisure activities. German tourists are second only to the USA in terms of travel activities.
- Components of biological diversity, such as genetic resources, are the indispensable "raw material" for modern bio-engineering, a growth sector of great potential.
- Through the capacity of populations to adapt to changing environmental conditions, genetic variety has important consequences for the stability and elasticity of ecosystems.

Our lives will continue to depend on the presence of biological diversity and biological resources in the future and this dependency is likely to increase due to the growing scarcity of finite resources and the advance of biotechnology. This trend will prevail notwithstanding the fact that human life will in future be influenced even more strongly by the application of modern technology. However, in the interest of material savings coupled with higher standards, the underlying structures and functions of biological systems are likely to serve increasingly as a models, since they are far more effective.

Moreover, the survival strategies pursued by species and the patterns of interaction between individuals and populations can be a valuable source of ideas for humankind.

The Convention on Biological Diversity

Countering the global threat to biological diversity is the aim both of the Convention on Biological Diversity, which has been ratified by some 170 States since the United Nations Conference on Environment and Development (UNCED) was held in Rio de Janeiro in June 1992, and of AGENDA 21, the action plan for sustainable development for the 21st century adopted at UNCED. The conservation and sustainable use of biological diversity are just as important for life on Earth as climate protection, which is the goal of the Framework Convention on Climate Change also signed at UNCED.

The Convention has three main objectives:

- conservation of biological diversity,
- sustainable use of its components, i.e. forms of use that do not pose a long-term threat to biological diversity,
- sharing the benefits arising from the utilisation of genetic resources in a fair and equitable manner.

The Convention is the first agreement under international law to recognise that biological diversity comes under the jurisdiction of nation states. It is now understood as a resource in the same way as oil or precious metals. Industrialised and developing countries are equally responsible for achieving the objectives of the Convention and safeguarding these resources for their continuing use by future generations, whose lives will also depend on them. As a highly industrialised and densely populated country connected by manifold economic links with other parts of the world, Germany must face up to this responsibility both at national level and in the context of its international relations.

Aim of the report

A large number of governmental and non-governmental actors in Germany have the potential to help combat the loss of biological diversity by taking measures to conserve diversity and use it sustainably. Only by creating a broad social consensus and acting in concert will it be possible to recognise the factors threatening biological diversity as a common problem and to combat them resolutely.

The present report is intended to serve this dual aim, namely to take stock of the existing status of biological diversity in Germany and to formulate recommendations and strategies. Its aim is to clarify our present position and identify the direction we must take if, in our own interests, we are to approach the goal of sustainable development. Achieving this goal is an obligation for us and a mission for the future in accordance with our commitment to UNCED.

2. Background

This chapter outlines the legal and political framework which forms the basis of the mandate and the terms of reference used in compiling the National Report. It describes the procedure applied in compiling the National Report and where responsibility for implementing its recommendations lies. The chapter contains a short description of biological diversity in Germany and of the institutional and legal framework for implementing the Convention.

2.1 Legal and political framework in Germany for compiling the National Report and the national strategy

The Federal Republic of Germany signed the Convention on Biological Diversity on 12 June 1992. The law implementing the Convention was passed on 30 August 1993 and published in the Federal Law Gazette on 9 September 1993, thereby translating the Convention into national law. On 21 December 1993 the Federal Government deposited the instrument of ratification at the Convention's secretariat; Germany thus became a State Party to the Convention. The Convention entered into force under international law on 29 December 1993.

The Parties to the Convention are obliged to report to the Conferences of the Parties on the measures which they have taken to implement the provisions of the Convention and on the effectiveness of these measures (Art. 26). Consequently, Germany submitted a preliminary "Report of the Federal Government on the Implementation of the Convention in the Federal Republic of Germany" *(Bericht der Bundesregierung zur Umsetzung des Übereinkommens in der Bundesrepublik Deutschland)* as early as 1995. The Second Conference of the Parties held in Jakarta in 1995 decided that the first full National Reports should be compiled for the Fourth Conference of the Parties and that they should focus on the implementation of Article 6 of the Convention (General Measures for Conservation and Sustainable Use).

The Second Conference of the Parties also proposed a common structure for compiling the report, which has been followed here. One year later, the Third Conference of the Parties in Buenos Aires set 1 January 1998 as a submission date for the first report.

2.1.1 Participation of political levels, social groups and institutions in the compilation of the National Report

The Convention on Biological Diversity is a very comprehensive agreement affecting many political and social spheres. In portraying the current situation a national report on the implementation of the Convention must therefore include all the different actors and levels of action.

The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU; *Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit)* has overall responsibility for compiling the present National Report. The report also incorporates contributions from the other Federal Government departments concerned with the measures for implementing the Convention. Frequent reference has been made to existing reports and publications of Federal authorities, which are listed below in a selected bibliography. For this reason, the present report dispenses with the presentation of detailed statistical material.

The National Report also seeks to give an impression of the variety that characterises Germany as a federal state. To ensure that the role of the *Länder* is properly dealt with, the *Länder* Working Party for Nature Conservation, Landscape Management and Recreation (LANA; *Länderarbeitsgemeinschaft für Naturschutz, Landschaftspflege und Erholung)* proposed topics as a basis for the independent contributions of the *Länder* administrations responsible in each case.

The draft of the National Report was agreed with representatives of the Federal Government departments and the Länder.

Contributions from the *Länder* appear in this report in boxes highlighted against a coloured background and their source is quoted. The respective institutions are responsible for the context of these boxes. While examples of individual activities are presented here, it should be borne in mind that other parties may be carrying out similar measures.

Non-governmental organisations representing socially important groups were also invited to make contributions. Approaches were made to associations and umbrella organisation working in the fields of nature con-

servation and protection, development policy, land management, countryside management, the private business sector, sport and tourism, science and academia, as well as the trade unions and the major churches.

2.1.2 Responsibilities for implementing the national strategy

In Germany, a large number of existing governmental and non-governmental institutions and organisations are involved in the implementation of the Convention on Biological Diversity. On the political and administrative level of the Federal Government, overall responsibility is in the hands of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety. In a number of important sections, however, responsibility lies within the scope of other departments (Table 1). The strategic recommendations made in Chapter 4 are directed primarily at the various levels of the Federal Administration, but also addresses the other actors.

In accordance with the federal structure of government in the Federal Republic of Germany, the *Länder* generally bear responsibility for the implementation of measures aimed at achieving the objectives of the Convention. In many cases - such as in nature conservation and forestry - the Federation only has narrow legislative powers in the form of framework legislation.

Table 1: Responsibilities at Federal level for sectors concerned with biological diversity

Federal Department	Responsibility
Federal Ministry for Regional Planning, Building and Urban Development	Setting sustainability as a goal for regional and settlement development, establishing appropriate principles, planning guidelines and instruments for regional planning and urban development
Federal Ministry of Education, Science, Research and Technology	Research in the fields of climate and atmosphere, remote geosensing, global and regional environmental aspects, production-integrated environmental protection
Federal Ministry of Finance	General financial aspects of the Federal budget related to the implementation of the Convention
Federal Ministry of Health	Genetic engineering
Federal Ministry of Food, Agriculture and Forestry	Conservation and sustainable use in agriculture, forestry and fisheries, safeguarding the genetic resources used in these sectors
Federal Ministry for the Environment, Nature Conservation and Nuclear Safety	Coordination and overall control in implementing the Convention on Biological Diversity in Germany, environmental protection and nature conservation
Federal Ministry of Defence	Sustainable, environmentally and ecologically sound use of military property and facilities
Federal Ministry of Transport	Transport
Federal Ministry of Economics	Tourism
Federal Ministry for Economic Cooperation and Development	Bilateral and multilateral development cooperation, GEF
Federal Foreign Office	International affairs

A third administrative tier, which has a major influence on biological diversity, is formed by the local authorities. At this level, initiatives to formulate a local Agenda 21 constitute a key starting point for the implementation of the Convention.

In addition to the governmental, political and administrative dimension, there are a wide variety of interest groups, initiatives and organisations in the non-governmental sector which, on the one hand keep a critical eye on government activities while, on the other, act as indispensable partners in the implementation of specific measures.

The various governmental and non-governmental research institutions create the essential scientific foundations for dealing responsibly with the components of biological diversity on the basis of reliable information and a sound understanding.

A decisive factor in developing a careful and protective approach to biological diversity that satisfies the criteria of sustainability will be public behaviour in our country. Surveys repeatedly confirm the high level of environmental awareness in Germany. Many people are convinced that consumer habits, particularly in the industrialised countries, will have to change if sustainable development is to be achieved. However, it is also often the case that the action of the individual or of individuals is not guided solely by personal environmental understanding and is thus rarely geared to the capacities of the natural environment.

2.1.3 Links with European activities

European Community Strategy to implement the Convention on Biological Diversity

The European Community (EC) also signed the Convention on Biological Diversity at UNCED in June 1992 in Rio de Janeiro and ratified it one year later. It has therefore become an independent Party to the Convention and is currently developing its own strategy to fulfil the objectives of the Convention. Important elements of this strategy can already be found in the Fifth EC Action Programme on the Environment of 1992 and the European Commission presented a report on its implementation in 1995.

Important elements here are EC Regulation 1467/94 on the conservation, characterisation, collection and utilisation of genetic resources in agriculture and EC Regulation 2078/92 on agricultural methods compatible with the requirements of the protection of the environment and the maintenance of the countryside.

In accordance with the principle of subsidiarity as applied within the EC, the Community only takes action if and insofar as the goals of planned measures cannot be adequately achieved by Member States and, in view of the scope or ramifications of these measures, can therefore be realised more effectively at Community level. Thus, the EC strategy on the implementation of the Convention will be complementary to the reports, strategies and action programmes of the individual Member States.

For the 30 countries involved, the European Cooperation Programme on Genetic Resources (ECP/GR) offers the framework for joint activities in networks dealing with numerous plant species as well as general questions.

Pan-European strategy on biological and landscape diversity

In 1995 the Ministerial Committee of the Council of Europe presented a "Pan-European Strategy on Biological and Landscape Diversity" to the 3rd Ministerial Conference on "Environment for Europe" in Sofia for discussion and adoption. The pan-European strategy is conceived as a parallel European measure to support the implementation of the Convention on Biological Diversity. As an initiative of the Council of Europe, its geographical scope of influence goes far beyond that of the Member States of the European Union.

Alluvial forest

The pan-European strategy creates a common framework for intensifying and extending existing initiatives. The strategy is based on an overall time-scale of 20 years. The practical implementation is organised in the form of five-year action plans.

A series of measures on the individual action priorities are set out in the first strategic action plan for the years 1996 to 2000; these were adopted at the 1995 Ministerial Conference in Sofia. They are to be implemented both as part of the regular work programmes of the governmental and non-governmental organisations involved and on the basis of national strategies to implement the Convention on Biological Diversity. Accordingly, the German strategy also builds on the pan-European strategy on biological and landscape diversity.

Ministerial Conferences on the Protection of Forests in Europe

At the 1990 Ministerial Conferences on the Protection of Forests in Europe in Strasbourg, Germany signed Resolution S2 on the "Conservation of Forest Genetic Resources" and, at the 1993 conference in Helsinki, Resolutions H1 on "General Guidelines for the Sustainable Management of Forests in Europe" and H2 on "General Guidelines for the Conservation of the Biodiversity of European Forests". Resolution H2 sets out principles for the conservation of biological diversity in Europe's forests and woodlands. The conservation of biological diversity is defined here as an essential element of sustainable forestry. The European Forest Genetic Resources Programme (EUFORGEN) has been developed to establish European coordination of efforts to conserve forest genetic resources.

2.2 Brief summary of Germany's geographical, ecological and economic situation, existing biological diversity and the institutional and legal framework

2.2.1 Germany's geographical and ecological situation

Germany lies within the Central European summergreen broadleaf zone. The dominant climatic influence is generally the country's position in the temperate zone, which experiences frequent weather changes, although the declining Atlantic influence towards the east and the influence of altitude and topography cause regionally varying climate conditions. Due to its geology, soil types and land use patterns, Germany has a great variety of landscapes. They include the sea and coastal areas along the North Sea and Baltic Sea, the glacially formed Northern German Lowlands, the Central German Uplands, the Alpine Foreland and the high mountain regions of the Alps. River courses and wetlands as well as particular locations on the windward barriers or lee slopes of mountains and hills create azonal or extrazonal conditions to which flora and fauna react in their own characteristic ways.

Germany's flora and fauna have established themselves essentially since the last Ice Age and contain elements from various bio-geographical regions. The habitats in Germany have been intensively used and shaped by man for millennia. Although human influence was felt everywhere, for a long time it did not reduce the overall biological diversity in the territory covered by today's Germany. Indeed, by transforming the Central European forest landscapes into a cultivated landscape, humans and their grazing livestock created numerous habitats of a new type, so that biological diversity in Central Europe initially increased until the middle of the last century (approximately in the area covered by today's Germany). However, the areas of forest cover and the biological diversity of woodlands were reduced, in some places dramatically, by the early forest clearing and over-exploitation, which continued up to the beginning of the 19th century. The onset of the industrial revolution placed increasing burdens on the environment. In the last 150 years, industrial development has led to a sharp decline in semi-natural and extensively used habitats (leaving aside the case of forests), not least as a result of the intensification of agriculture, the ongoing sprawl of human settlements and the construction of transport and water networks.

2.2.2 Germany's economic situation

With 81.8 million inhabitants living in an area of around 357,000 km^2, Germany is a highly industrialised and densely populated country. Despite this, some 55% of the country's surface area is used for agriculture. 30% of the surface area - significantly more than 150 years ago - is covered by forest and woodland. The areas used for settlement and transportation occupy approx. 11%.

The current slight rise in population is a trend that is expected to continue until the year 2000. Population increases will probably occur mainly in the already densely settled conurbations, while the already relatively sparsely populated rural areas will continue to lose inhabitants. A clear decline in population is expected from 2020.

Traffic congestion on the A 59 motorway at Römlinghoven

The high degree of industrialisation and Germany's position in the middle of Europe have led to high volumes of traffic, which have again increased considerably in the wake of German reunification, the commercial opening of Eastern Central Europe and Eastern Europe and the creation of an internal market for Europe as a whole - a trend that is continuing in intensity. On a statistical average there is now one car for every two inhabitants of Germany. Current forecasts predict a significant growth in traffic over the next fifteen years.

High industrial output and high living standards go together with the German economy's strong international orientation. No other major industrialised country generates such a high proportion of its wealth through exports. Very few countries import raw materials and consumer goods from abroad on a comparable scale and very few countries have citizens who are so keen on travelling and make as much use of tourist services in other countries or spend comparable sums on tourism abroad (1996: DM 70 billion).

High economic performance and high living standards imply high consumption of energy and raw materials. The problem of pollutant emissions into the aquatic environment and the atmosphere was recognised at an early stage in Germany and this recognition led to the introduction, from the beginning of the 1970s, of ambitious preventive and precautionary environment policies. Germany is internationally renowned for its high standard of technical environmental protection. Its achievements in this area were acknowledged in 1993 by the Environmental Performance Review of the Organisation for Economic Cooperation and Development (OECD). However, despite progress in the sphere of technical environmental protection, the threats to biological diversity have not been conquered (cf. Chapter 4.1).

2.2.3 Existing status of biological diversity in Germany

The general conditions outlined above have an impact on the various components of biological diversity, which are:

- the diversity of ecosystems,
- the diversity of species,
- the genetic variety within species.

Diversity of ecosystems

About 750 different types of biotope have been identified in Germany.

In Germany, natural habitats or biotic communities mainly exist in relatively small areas (e.g. certain water sources, cliffs, raised bogs, the Wadden Sea, some forests and woods, high-alpine regions), which are all to some extent impaired by pollutant impacts. Apart from the forest components, there has, over the last five decades, been a decline in the total area covered by semi-natural biotopes (sites such as forests and extensive grasslands that are influenced by human use but still

Lüneburg Heath

display much the same the functions, elements and structures as potentially natural vegetation or that are

still predominantly populated by the native biotic communities typical of the site). By far the largest area of land is now occupied by anthropogenic habitats, i.e. those which have evolved from human activity and differ in their structure and composition from natural biotopes. Examples here are fields, grasslands used to varying degrees of intensity, forests and urban industrial habitats. The anthropogenic biotopes also include many of the heaths, coppice and composite forests, oligotrophic grasslands and marshes usually considered valuable in terms of their special diversity, which mainly emerged from semi-natural forests as a result of particular management practices, over-exploitation or clearing.

Most of the habitat types in Germany are also to be found in other countries in Central Europe. Germany can boast a major proportion both of certain habitats that are typical of Europe's major regions (e.g. the Central European beech forests) and also of globally unique ecosystems (Wadden Sea)

Significance of habitats: the case of forests

For more than 90% of Germany's surface area the potentially natural type of vegetation would be one of various types of forest. Following the Ice Ages, forests colonised Central Europe, with the exception of high mountain areas, sea coasts and some special sites. As the human population expanded, the forests were pushed back not only to make way for agriculture and settlement but also as a result of the excessive logging typical of forest use up to the 17th century. However, since the introduction of managed forestry, total forest cover has begun to increase again and a third of the country is now covered by woodlands.

Forests are home to a relatively high proportion of semi-natural biotopes. Fostered by forest management, forests tend to contain stands of different age and type, which alternate both spatially and temporally. This pattern leads to a variety of climate, soil and light conditions. Such alternation creates a dynamic and tightly interlocking network of diverse sites, habitats and forest ecosystems distinguished by the composition and structure of their tree, bush and herb strata as well as by their fauna.

In addition to their role as a semi-natural habitat, Germany's woodlands perform a range of different economic, conservational and recreational functions. Among other things, the forest provides a source of employment and income for a great many people, especially in rural areas. Due to the long-term nature of forest utilisation, it is not surprising that concepts of sustainability were developed in the forestry sector at a very early stage.

[Contribution by the Federal Ministry of Food, Agriculture and Forestry]

The Siebengebirge Hills

Species diversity

About 45,000 animal species and 28,000 plant species (if lower plants are included: the vascular plant species number approx. 3,200) have so far been identified in Germany. By international comparison, however, Germany displays the same lack of endemic flora and fauna found in most Central European countries. On the other hand, Germany is, even on a world scale, a major wintering and resting ground for migrating animals on their passage from the west and south in the autumn and on their return journey to the northern breeding grounds in the spring (e.g. migratory birds, bats).

Table 2 provides an overview of some of the wealth of species living in Germany.

Table 2: Species diversity in Germany (selected groups)

Species groups	Number of species in Germany
Vascular plants (flowering plants and ferns)	> 3,240
Mosses	> 1,120
Lichens	> 1,690

Species groups	Number of species in Germany
Basidiomycete and ascomycete fungi	> 9,300
Diatoms	approx. 3,000
Green algae	> 2,000
Mammals	98
Birds (incubating birds)	273
Reptiles	12
Amphibians	19
Freshwater fishes and cyclostomes	70
Marine fishes and cyclostomes	115
Molluscs	approx. 500
Insects	approx. 29,500
Arachnids	approx. 4,400

Species diversity in woodland habitats

The forests and woods constitute important habitats for wild animal and plant species. The proportion of woodland-based species is very high, accounting for about a quarter of all the native fauna and flora. Moreover, forests are important buffer zones compensating for ecological deterioration and often serving as a refuge for species whose habitats outside the forests are increasingly being degraded. In this respect the forest margins play a particularly important role.

Of the 3,200 vascular plant species native to Germany, half grow in forests and woods and about a quarter are primarily located there. Broadleaf and mixed forests on high-alkaline sites are particularly rich in species. With as many as 340 flowering plant species, these forest types may contain a comparatively high number of species, even rivalling dry grasslands, which harbour 372 species. Around 1,500 species of fungi live on dead trees and rotting wood. However, compared with tropical forests and temperate forests on other continents, Central Europe's woodlands have a natural relative dearth of species, not least due to the extinction of particularly large numbers of species and genera in Central Europe during the Ice Ages.

In Germany, the number of animal species and their respective density of individuals is higher in forests than in any other terrestrial habitat. Some 6,800 species of fauna can be found in beech forests alone, 1,800 of which are closely tied to this particular habitat. A high proportion of insect species are dependent on woodlands. For instance, two thirds of the native beetle species live in forest habitats, nearly 20% of which depend on dead trees and rotting wood.

[Contribution by the Federal Ministry of Food, Agriculture and Forestry]

Seckbach Marsh (alluvial forest)

Genetic variety

In the past, little attention was paid to genetic variety among wild species, although it is in fact crucial to the continued abundance of biological forms, the development of species diversity and the functioning of biotic communities. The extent of diversity within a species depends upon the number of individuals, its geographi-

Grove bettle (carbus nemoralis)

cal range, the degree of isolation of individual populations and its particular genetic system. An important role is also played by natural and anthropogenic processes of selection as well as factors influencing spatial and temporal changes in the genetic stock of the species or populations. Genetic variety is essential to the ability of species and populations to adapt to changing environmental conditions and is therefore a prerequisite for their survival.

In studying diversity in individuals and populations of the same species, various biochemical and genetic methods are now available that enable us to identify, measure and document differences that go beyond the morphological, anatomical and phenomenological features. However, with a few exceptions, we still know very little about the extent of, the historical changes in and the threat to genetic variety in natural populations.

Forest tree species are found in Germany in the form of wild populations, populations that are still partly autochthonous, and populations used by humans, the latter being predominant. As organisms of extremely great longevity and site continuity, the forest tree species demonstrate an ability to adapt to dynamic environmental conditions that derives from their particularly high genetic variety. This applies to individuals and populations in equal measure.

Genetic resources in agriculture and forestry

There are some essential differences between the genetic resources of wild species, on the one hand, and genetic resources used for agriculture or forestry on the other. What characterises the latter is:

- deliberate genetic change to facilitate commercial use, especially with regard to agricultural crops,
- comparatively rapid genesis of agricultural varieties and breeds,
- conscious control of genetic dynamics in breeds of domesticated animals.

Livestock farming in Germany (Benediktbeuren)

We currently know more about the genetic variety that exists in cultivated plants and domesticated animals than in wild species. As plants and animals adapted gradually over thousands of years to habitats shaped by human activity, there emerged "local" varieties of cultivated plants, "ecotypes" in grasslands and local breeds of domesticated animals. These, together with the imported plants and animals, laid the foundation over the last 150 years for the intensive breeding of cultivated plants and domesticated animals, resulting in the creation of new varieties and breeds.

In Germany some 1,400 species are used in agriculture, forestry and horticulture. Whereas the grassland communities are predominantly made up of native species or those introduced a long time ago, a large proportion of the fruit species grown in Germany originate from other geographical and climatic regions of the world, although some of these species did already find their way to Central Europe thousands of years ago - helped, intentionally or unintentionally, by human activities.

Moreover, some native plants underwent domestication as crops, such as in the case of certain fruit species, vegetables or dye and oil-producing plants. In the case of wild plants, many local names bear witness to their traditional uses for medicinal and other purposes.

Oil-producing sunflowers

Of the approximately 40 species of domesticated animal occurring worldwide, cattle, pigs, sheep, goats, horses and poultry are of particular economic importance in Germany.

We have a better knowledge of genetic variety in relation to cultivated plants and domesticated animals than wild species. As flora and fauna gradually adapted over thousands of years to habitats shaped by human activity, "local varieties" of cultivated plant, "ecotypes"

in grasslands and local livestock breeds began to emerge. It was these, along with plants and animals introduced from other regions, that laid the foundations for intensive crop and livestock breeding in the last 150 years with its selective diversification to form new varieties and breeds.

2.2.4 Institutional and legal framework and current programmes

In the law of 30 August 1993 implementing the Convention on Biological Diversity, which formally transposes the Conventions into national law, the introduction states that the implementation of the Convention is to proceed within existing legal provisions and activities. Thus a brief overview of the institutional and legal frameworks is necessary in order to understand the mechanism and instruments which can be deployed in Germany when implementing the Convention.

The Federal Republic of Germany is a federation comprising 16 constituent states or *Länder.* The functions of government are distributed between three tiers, namely Federal Government, *Länder* and local authorities, with the structure of administration varying between individual *Länder*. The *Länder* are generally responsible for making and enforcing law, unless these powers have been expressly conferred on the Federal Government by the Federal Republic of Germany's constitution, the Basic Law. For some areas of law, the Federal Government issues outline provisions, which are then elaborated in *Land* legislation. The enforcement of both Federal and *Land* legislation is almost entirely a matter for the *Länder*. However, in many fields the *Länder* have decided to confer powers to enforce environmental law upon the towns and districts.

Cooperation between the Federal Government and *Länder* is particularly important for the success of environment and nature conservation policies. The *Länder* take part in the federal legislative process via the *Bundesrat*. Moreover, the Federal Government consults with the *Lände*r at an early stage on its policy plans.

The fundamental principles on which the European Union is built and the legal order already in force within it also have a considerable influence on the framing of German environmental law at the Federal, *Land* and local authority level. They represent an element of supranational law, which is applicable in Germany in some cases directly (EC Regulations) or, in other cases, following transposition into national law (EC Directives).

Germany is a party to a number of international conventions whose objectives concur completely or partly with the objectives of the Convention on Biological Diversity. These Conventions also assume legal force once they have been introduced into national law.

Following an amendment to the Basic Law in 1994, protection of the natural sources of life has acquired the status of a constitutional imperative.

In Germany, measures to safeguard biological diversity, to secure its sustainable use and to reduce the impact of harmful substances are essentially founded on the following laws:

Table 3 Selection of the most important German legislation (Federal level) directly concerned with biological diversity (i.e. non-exhaustive list excluding inter alia EC Regulations/Directives and statutes to implement international agreements)

Legal Regulation	Objective / content
Basic Law (Grundgesetz)	Protecting the "natural sources of life"
Federal Nature Conservation Act *(Bundesnaturschutzgesetz)*	Securing on a sustainable basis the proper functioning of the ecosystem, the utility of nature's resources, fauna and flora as well as the variety, uniqueness and beauty of nature and the landscape to serve as the basis of human life and a source of recreational enjoyment of nature and the countryside; offering inter alia comprehensive protection of specific biotopes; provisions governing, in particular, the protection of, trade in, and the

Legal Regulation	Objective / content
	keeping and breeding of certain animal and plant species or populations of such species; provisions on the release of non-native species
Federal Ordinance on the Conservation of Species *(Bundesartenschutzverordnung)*	Specifying individual restrictions on extraction and sale; placing protection orders on endangered animal and plant species
Regional Planning Act *(Raumordnungsgesetz)*	Sustainable regional planning designed to bring the social and economic demands on land space into accord with the ecological functions of that space
Building Code *(Baugesetzbuch)*	Sustainable planning of urban development and socially equitable land use helping to create an environment worth living in
Land Consolidation Act *(Flurbereinigungsgesetz)*	Development of rural areas; creation of better and healthier living, housing and working conditions for people living in the countryside; preserving, caring for and restoring threatened or damaged historical landscapes; ensuring the continued proper functioning of the ecosystem
Federal Forest Act *(Bundeswaldgesetz*)	Enforcing an obligation to conserve and, where appropriate, expand forests and woodlands and use them sustainably; maintaining the forest's economic, protective and recreational functions taking into account biological diversity; promoting forestry; reconciling conflicts of interest between the wider community and forest owners; ensuring the participation of forest authorities in public planning and measures; the framing of more detailed legislation is left to the *Länder*
Federal Hunting Act *(Bundesjagdgesetz)*	Enforcing an obligation to care for game, defined as the maintenance of habitat-appropriate, species-rich stocks and management and safeguarding of the environment they need; protecting specific species; detailed framing by the *Länder*
Federal Game Protection Ordinance *(Bundeswildschutzverordnung)*	Transposing into national law the restrictions stipulated under the EC Directive on the Protection of Wild Birds with respect to those bird species defined in the Federal Hunting Act; bans on ownership and sale
Plant Protection Act *(Pflanzenschutzgesetz)*	Licensing and application of plant protection agents
Fertiliser Act, Fertiliser Ordinance *(Düngemittelgesetz, Düngeverordnung)*	Licensing and application of fertilisers

Legal Regulation	Objective / content
Animal breeding legislation *(Tierzuchtrecht)*	Regulating animal breeding taking into account the need to safeguard genetic resources (domesticated animals)
Commercial Seeds Act *(Saatgutverkehrsgesetz)*	Assuring the quality of seeds
Law on the Protection of New Varieties of Plants *(Sortenschutzgesetz)*	Protecting the intellectual property rights of plant breeders regarding varieties
Commercial forestry seed legislation (Forstsaatgutrecht)	Improving the economic yield and environmental benefits of the forest; provisions cover 19 main tree species used in forestry; consideration of genetic diversity aspects; labelling of seeds and plants with reference to autochthony and region of origin, categorised according to ecological conditions and phaenotypical and genetic characteristics of forest stands
Law on the joint Federal / Länder Task of Improving Agricultural Structures and Coastal Defences *(Gesetz über die Gemeinschaftsaufgabe "Verbesserung der Agrarstruktur und des Küstenschutzes", GAK)*	*Inter alia:* improving productivity and working conditions in agriculture and forestry; managing the development of the countryside; hydrological and agronomical measures; improving market structures in agriculture, fisheries and forestry
Genetic Engineering Act *(Gentechnik-Gesetz)*	Provisions governing work in genetic engineering facilities, the release of genetically engineered organisms, bringing products containing genetically engineered organisms onto the market
Federal Immission Control Act and Federal Immission Control Ordinances *(Bundesimissionsschutzgesetz and Bundesimmissionsschutz-verordnungen)*	Protecting humankind, animals and plants, the soil, water and the atmosphere, as well as cultural and other physical assets from harmful environmental impacts and from substantial problems caused by immissions
Federal Water Act *(Wasserhaushaltsgesetz)*	Limiting emissions into the aquatic environment; ensuring economical use of water, maintenance of the quality of surface and ground water and the functions it performs; enforcing an obligation to conserve the aquatic environment as the natural habitat for animals and plants
Closed Substance Cycle and Waste Management Act, Sewage Sludge Ordinance *(Kreislaufwirtschafts- und Abfallgesetz, Klärschlammverordnung)*	Promoting closed substance cycles (recycling waste materials) to reduce the depletion of natural resources
Chemicals Act *(Chemikaliengesetz)*	Protecting people and the environment from the effects of hazardous substances and preparations; prohibiting certain substances from being brought into circulation

A large number of institutions, organisations and programmes are performing measures that serve to implement the Convention (cf. Chapter 5). These have already been presented in detail in other publications (cf. bibliography in annex). The further implementation of the Convention does not require the creation of any new institutions. However, improvements must be made in the way the various actors cooperate with each other so that we can build on existing structures, pool our resources and generate synergies.

3. Objectives and models in the approach to biological diversity

This chapter presents the objectives and models applied in general and in specific areas in the approach taken in Germany to biological diversity and outlines the starting points for their implementation.

3.1 Models for sustainable development

The conservation and sustainable use of biological diversity is a central plank of German policy on the environment, nature conservation, agriculture, forestry and fishery. The policy strategies in these fields are primarily based on the model of sustainability and sustainable development and are pursued as a common responsibility by all elements in society within Germany's ecologically-committed social market economy.

Sustainable development

Ecology, economy and social security form an indivisible whole. This is at the heart of the model of sustainable development on which the international community agreed in Rio in 1992. For development is only sustainable if these three aspects can be united. Improvements made in economic and social living conditions must be in harmony with the long-term imperatives of safeguarding the natural foundations of life.

Ecologically committed social market economy

The social market economy provides an appropriate regulatory framework in which both producers and consumers can show the initiative and creativity needed to attain sustainable development and in which market forces can become effective in achieving social and ecological goals. Like all processes of innovation, the development and refinement of sustainable production methods and products requires entrepreneurial initiative, a willingness to invest and dynamic markets. Moreover, to achieve ecological objectives efficiently, it is necessary to observe economic principles, such as the protection of confidentiality when investments are made.

Common responsibility

Social causes of environmental problems, such as consumer behaviour, leisure patterns or mobility needs, play an increasingly important role. It will only be possible to bring about a palpable reduction in environmental impacts on any lasting basis if individuals change their values and lifestyles. Since the individual does not directly perceive and experience many of the environmental hazards, the Federal Government attaches great importance to raising awareness by providing information, running educational campaigns and promoting dialogue on environmental issues.

In introducing sustainable forms of economic activity, individual spheres of society will be affected in different ways and to differing degrees. The principle of common responsibility also means that both the burdens and the benefits that arise from this necessary change must be shared by all members of society in the spirit of solidarity. By the same token, the principle of common responsibility also demands worldwide solidarity among States. In the long run, only joint action in the form of an environmental partnership can successfully solve global problems.

3.2 Principles applied in environment and nature conservation policy

Since the early 1970s, German policy on the environment and nature conservation has followed the three fundamental principles:

- the principle of precautionary action,
- the polluter-pays principle,
- the principle of cooperation.

In addition to averting dangers facing us, the principle of precautionary action obliges us to reduce the risks to humankind, nature and the environment using the advances made in science and technology. The principle of precautionary action is best served by integrative strategies which prevent environmental burdens occurring from the outset.

The aim of internalising the costs arising from the ecological knock-on effects of production, consumption and disposal is central to the polluter-pays principle, which constitutes both a principle of cost allocation and a criterion by which to measure economic efficien-

cy. The use made of the environment and nature must be increasingly reflected in costs and market prices to an appropriate degree. Only in this way will companies and private households receive the correct, i.e. sustainability-promoting, price signals on which to base their decisions.

The principle of cooperation calls for the broadest possible participation of all concerned, i.e. the public, industry and social groups, in the process of formulating and implementing the objectives and measures to be pursued under a policy of sustainability. A prime example of this approach is the arrangements for contract-based nature conservation or the Federal Environment Ministry's initiative entitled "Steps towards sustainable, environmentally sound development: Environmental objectives and central areas of action in Germany" (cf. Chapter 3.5)

Finally, efforts to treat nature and the environment in a particularly gentle manner should be recognised and rewarded, especially where companies taking this approach have to accept additional costs or lower returns. The beginnings of an internalisation of external costs and benefits can still only be seen here and there and must be further developed.

3.3 Conservation and sustainable use of biological diversity

To ensure the long-term conservation of biological diversity, it is essential to take measures at various levels:

- direct protection and conservation measures,

Environmental monitoring station

- reduction in chemical pollution and other burdens on biological diversity that act either directly or via the environmental media (air, water, soil), and alleviation of the consequences of existing burdens,
- development and application of concepts, processes, techniques and technologies for the sustainable use of biological diversity.

a) Conservation of biological diversity by means of protective measures

The conservation of biological diversity by means of direct protective measures covers such aspects as spatial and zonal protection of habitats through implementation of legal provisions and contractual agreements, species protection measures (including restrictions on the removal from nature, ownership of and trading in wild animal and plant species) and activities to safeguard genetic variety and genetic resources for food, agriculture and forestry or for medical or pharmaceutical purposes. The aim of these direct measures is to maintain the productivity of the ecosystem, the utility of natural assets and the unique features of landscapes and to secure on a permanent basis the natural foundations of life for all organisms. The task is to maintain the diversity of genetic resources, giving priority to dynamic measures to protect this diversity in its natural surroundings *(in situ)*, while also reinforcing these measures where necessary by means of static conservation measures taken outside the species' own habitat *(ex situ)*.

b) Protecting against chemical pollution and other impacts

Nationwide inputs of nutrients and harmful substances from various sources (industry, private households, small-scale consumers, agriculture and transport) which enter ecosystems either directly or via the environmental media of air, water and soil can, in addition to other impacts, lead to a degradation of biological diversity in these ecosystems. That is why critical loads for specific ecosystems, i.e. the limit values below which these ecosystems can tolerate or compensate for chemical pollution, should not be exceeded and air-pollution control policy must be rigorously pursued.

c) Conservation of biological diversity through sustainable use

For the most part, it is not possible in the long run to maintain biological diversity in Central Europe by means of direct conservation measures alone (such as site protection). In a densely populated country like Germany, the population depends upon its ability to utilise many components of biological diversity. By the same

Spreading of plant protection agent in maize crop

token, a considerable part of the country's biological diversity depends on human economic activity (e.g. heaths, oligotrophic grasslands, marshlands, coppice woods, mixed tree species in many beech forests, cultivated plants and domesticated animals). That is why sustainable use is essential to the conservation of much of the biological diversity in Germany. The utilisation of biological diversity is often driven by goals and needs that are not related to conservation. Yet if the conservation of biological diversity is not an integral part of its sustainable management, that utilisation will, sooner or later, itself come under threat.

The following are the most important sectors in which biological diversity may only be utilised in a sustainable fashion:

Agriculture

Agriculture, which takes up 55% of Germany's surface area, is vital to the survival of a significant proportion of the biological diversity found in Germany. The burdens farming activities place on nature and the environment are to be further reduced in the future and, where appropriate, farmers are to be rewarded for efforts that go beyond required practice.

In order to safeguard and promote the various functions of agriculture, the Federal Government is pursuing four main objectives:

- improving living conditions in rural areas and enabling those working in agriculture to benefit from the general trends in terms of income and prosperity,
- supplying the population with high-quality food at fair prices,
- improving foreign trade relations in the agricultural sector and the global food situation,
- securing and improving the natural foundations of life and conserving biological diversity. Great importance is attached here to the conservation and sustainable use of the genetic resources of livestock and crops.

Forestry: barking a tree

Forestry

In Germany 30% of the land is given over to forestry, the second most important form of land use after agriculture in terms of area. Not only is it significant in terms of size, but forestry also plays a key role in the conservation and sustainable use of natural habitats, biotic communities, flora and fauna and their genetic variety, since a large proportion of natural and semi-natural biotic communities and native animal and plant species are found in forests and woodlands.

Sustainable forest management has a long tradition in Germany. The basic idea of sustainability was developed by German foresters over 200 years ago and has since been gradually developed into a multi-functional concept of sustainability. Sustainable forest management takes full account of the notion of biological diversity, recognising that high-level biological diversity appropriate to the specific location enables forestry to pursue a wide variety of uses, promotes the stability, efficiency and adaptability of forests, and allows the forest to perform its protective and recreational functions. The Federal Government is committed to comprehensive sustainability as defined in Resolution H1 adopted by the 1993 Ministerial Conference on the Protection of Forests in Europe, largely at Germany's instigation. The conservation of biological diversity is an integral aspect of this concept of sustainability.

The Federal Government and the *Länder* base their forest policies and the management of their own forest areas on the model of semi-natural multi-purpose forestry. It is the aim of German forest policy to establish mixed stands that are site-appropriate, stable, structurally diverse and, where possible, naturally rejuvenated. This aim is best achieved by practising ecological forestry. The use of site-appropriate and, thanks to high genetic diversity, adaptable propagation material of tree and bush species is crucial in forestry for the maintenance of the efficiency, stability and dynamism of forest ecosystems. In view of their ecological, economic and ethical significance to woodlands and forestry, forest genetic resources must be conserved, researched and sustainably used to the benefit of future generations.

Hunting

Hunting in Germany involves a commitment to care for a species-rich and healthy game population appropriate to the conditions of the respective landscape and region and to safeguard its essential habitats. Hunting must take into account the concerns of nature conservation, countryside stewardship and forest management.

Fisheries

The fishing industry can only be sure of a stable future if fishing is practised, over the long term, in harmony with nature.

In working to establish a sustainable fishing industry, the Federal Government is pursuing the following objectives:

- security of the supply of fish and fish products to the population,
- long-term conservation and, where necessary, replenishment and revitalisation of fish stocks,
- a harmonious relationship between fisheries and marine environment protection,
- safeguarding of the local culture in coastal regions dependent on fishing.

In relation to the work of the United Nations Environmental Programme (UNEP) and the Commission on Sustainable Development (CSD), the following principles of sustainable fisheries have been adopted:

- protection of living marine resources and of the ocean's biological diversity in accordance with the principle of precautionary action,
- replenishment of endangered fish stocks and efforts to ensure the sustainable exploitation of all fish stocks,
- appropriate financial, economic and technological cooperation with developing countries to ensure attainment of these goals.

Transport

The objectives of action are to promote environmentally clean mobility patterns with minimum impact on nature:

- traffic avoidance: the aim is to avoid unnecessary traffic while seeking to sever the link between growing traffic volumes and economic growth by creating structures in industry and in urban development that are less transport and travel intensive;
- switching more traffic to environmentally cleaner means of transport: the main aim is to expand the role played in the transport system by the more environment-friendly railways and waterways, especially in the goods sector, and to enhance the attractiveness of local, regional and long-distance public transport;
- reducing the pressures on land through road building and transport infrastructure: the aim is to minimise additional land depletion and make better use of the existing infrastructure with the help of electronic routing systems (telematics);
- technical optimisation of vehicles and fuels: the aim is to reduce the energy consumption and pollutant emissions of individual vehicles, to further the use of cleaner fuels, to develop new ways of powering vehicles, and to improve the scope for recycling scrapped vehicles;
- information campaigns to raise public awareness of the benefits of ecologically favourable transportation and vehicle use.

Military use

Approximately 1% of land in Germany is given over to the Federal Armed Forces, the *Bundeswehr*, for training and exercises. The military training areas of the *Bundeswehr* are, for various reasons, of great importance to the conservation of biological diversity.

In various concepts, guidelines and decrees, the *Bundeswehr* has formulated a desire to perform its defence mission in the most sustainable and ecologically sound manner possible. To this end, military training areas

are used in accordance with conservation considerations in an effort to minimise the impact on natural resources.

Former Russian military training area Retzow-Stepenitz

Spatial and settlement development

Spatial development in Germany is primarily determined by the long-term impacts of social and economic conditions. The major factors are *inter alia* demographic trends and changes in the economic structure. The goals of sustainable regional development include:

- reconciling and balancing the social and economic demands on the region with its ecological functions (nature and landscape conservation as well as water, climate and soil protection),
- protecting the diversity of the existing historical landscape,
- securing the natural foundations of life,
- keeping the options for land use open in the long term,
- using water, land and soil sparingly and carefully, while also preventing development on spaces needed for local recreation and for ecological balance.

It is particularly important that we succeed in severing the link between economic growth and the current rate of land depletion due to sprawl from human settlement and the transport infrastructure.

Leisure and tourism

For the majority of people in Germany leisure and tourism have, over the years, become an increasingly important aspect of life. Spending on leisure activities amounts to 10 to 20 percent of household expenditure, depending on income level. There is a marked trend towards countryside leisure pursuits.

Hang-gliders in the Alps (nature reserve in the Ammergau mountains)

The objectives of proactive policies on recreation in Germany are:

- safeguarding the diversity, uniqueness and beauty of nature and the landscape,
- conserving and developing suitable recreational areas,
- guaranteeing public access to the countryside.

In collaboration with the tourism and leisure-sector associations, the Federal Environment Ministry (BMU) supports concepts and a wide range of measures designed to reduce environmental burdens caused by leisure behaviour and to initiate environmental protection activities specific to the tourism industry (for instance, developing sets of ecological criteria, holding competitions, running environmental award schemes). In a joint statement on the environment the German tourism industry associations have declared their commitment to sustainable development in tourism. The leisure and sport associations have also adopted similar guidelines. Principles and proposals for conservation-oriented planning and management of the leisure and tourism sector were formulated in the "Berlin Declaration" *(Berliner Erklärung)*, agreed in March 1997 during the International Tourism Exchange, with a view to ensuring that due consideration always be given to nature's capacity to withstand the burdens of tourist activities (cf. Chapter 5.9.2).

Biotechnologies and genetic engineering

Processes for the biotechnological exploitation and genetic engineering of organisms extend the range of their possible uses by humankind in, for instance, the

spheres of drug manufacture, the production of vegetable raw materials, food production and environmental protection. The aim here is to continue to ensure a responsible, cautious and transparent use of biotechnologies and genetic engineering.

Research and technological development

Policies for sustainable development require scientific preparation and a firm foundation in science. This means that science and research are to be incorporated even more closely into the political and social decision-making processes leading towards sustainable development.

The overriding objective of the environmental research programme of the Federal Government is to initiate, within science and industry, research and development efforts to identify options for action on, and possible approaches to, the avoidance of undesirable impacts and the sustainable use of the environment by industry and society. The primary aim is to establish economic and social development that allows prosperity to flourish whilst enabling a properly functioning ecosystem and biological diversity to be permanently maintained.

In a densely populated country like Germany, the loss of biological diversity cannot be stopped by measures that are restricted to conserving the natural status in isolated sites. It is necessary to pursue effective nature conservation strategies that take full account of human economic activity and are integrated within the different forms of land use.

Botanical trip in the Kuttenberg area

In some extent the scientific foundations enabling such concepts to be developed have still to be created. Here, an interdisciplinary approach and the incorporation of all relevant research areas is required.

Environmental education and public acceptance

As an aspect of general and vocational education, environmental education is intended to equip the individual to treat nature and the environment in an informed and responsible manner. It forms an indispensable element in the process of consciousness raising within society and is crucial to the conservation and sustainable use of biological diversity. Environmental education is designed to help people understand the ecological interrelationships, recognise the consequences of their own patterns of consumption and economic behaviour, and become aware of activities that will contribute to the conservation and sustainable use of biological diversity.

3.4 Specific international goals and models

The Federal Government's general development policy goals in the field of environmental and resource protection

In addition to poverty alleviation and the promotion of education, environmental and resource protection is also a priority area of German development cooperation policy. The aim here is to support developing countries in an effort to

- implement the concept of sustainable development and elaborate the necessary legal foundations,
- establish functional and economically efficient institutions in the environment sector and build capacities in terms of national human resources,
- transfer environmentally favourable technologies, and
- combat poverty as one of the central causes of inappropriate, non-sustainable ways of producing and living,
- exchange know-how on sustainable use, such as traditional management practices, low intensity farming systems and ecological forest use.

International efforts to conserve forests

The Federal Government's international forest policy centres on efforts to safeguard forests worldwide. In particular, the alarming threat to and destruction of tropical forests is leading to an irreversible loss of a significant part of the world's natural heritage and endangering the natural balance of the Earth as a whole. The

manifold and interrelated causes of this destruction demand integrated solutions to meet the particular set of problems faced in different regions.

The Federal Government is committed to implementing and carrying forward the UNCED decisions. This it does, for example, through the framework of the UN Commission on Sustainable Development (CSD). At the June 1997 Special Session of the General Assembly of the United Nations in New York to appraise the implementation of the Rio results, Germany and the EU called for a mandate to open intergovernmental negotiations on an international forest convention. The purpose of such a convention would be to lay down general principles, guidelines, obligations and stringent standards for the management, protection and sustainable development of forests worldwide. In the face of opposition from a number of States, these negotiations did not lead to the desired outcome. However, intensive negotiations have resulted in the setting up of an Intergovernmental Forum on Forests (IFF), which will continue the work of the previous Intergovernmental Panel on Forests (IPF) and, among other things, identify the elements that might in future form part of a binding instrument regulating the forest sector. A decision is to be taken in the year 2000 at the eighth session of the CSD on whether to initiate an intergovernmental negotiating process with the aim of creating such a binding instrument.

Germany is also committed to establishing international framework agreements on the labelling of timber from sustainably managed forests.

Development cooperation in the forestry sector aims primarily to safeguard and promote responsible use of forest resources and forest ecosystems in the partner countries in the interests of national development. Cooperation in the forest sector generally encompasses the following objectives and tasks:

- protection of forest areas of outstanding national or international significance either as habitats for local and, above all, indigenous communities or as ecosystems particularly worthy of conservation,
- sustainable use and management of forests in the interests of the population and the national economies of partner countries,
- avoiding or minimising forest depletion in other development cooperation projects.

At the pan-European level, the Federal Government works within the Ministerial Conference on the Protection of Forests in Europe (Strasbourg 1990, Helsinki 1993 and Lisbon 1998) to counteract the threat to forests.

At the FAO, Germany has, together with the EU and other States, been arguing for a global action plan for the conservation and sustainable use of forest genetic resources. Germany has not so far been able to prevail with this initiative.

Climate protection

Global climate change will also have a direct impact on the diversity of ecosystems, species and their genetic variety. That is why progress in implementing and taking forward the Framework Convention on Climate Change (signed in 1992 in Rio de Janeiro) also serves the objectives of the Convention on Biological Diversity. The same is true of measures to protect the ozone layer. The Federal Government is committed at national and international level to effective measures for protecting the planet's atmosphere and the global climate.

Access to genetic resources

The utilisation of genetic resources, one of the components of biological diversity, can be a potentially lucrative source of added value. So far little experience has been gained worldwide in tackling the question of how to regulate access to the genetic resources of a Party (over which that State exercises sovereign rights under the terms of the Convention on Biological Diversity) and what form recompense could take. Germany is endeavouring to help clarify the complicated legal questions. The Federal Government seeks to develop voluntary and market-oriented solutions to the access issue that will allow cooperation between industrial partners and the country of origin of genetic resources in each case.

Biological safety

Biotechnology and, in particular, genetic engineering are being used to an increasing extent in agriculture and elsewhere. The handling of living, genetically modified organisms poses another potential risk to biological diversity. With this in mind, the 2nd Conference of the Parties to the Convention on Biological Diversity passed a resolution to draw up a legally binding protocol on biological safety designed to ensure that cross-frontier traffic in these organisms does not pose any threat to biological diversity.

Initiative to establish a global network of protected areas ("hot spots")

At the Special Session of the UN General Assembly in June 1997, Federal Chancellor Dr Helmut Kohl, together with the heads of state and government of Brazil, Singapore and South Africa, presented a "Global Initiative on Sustainable Development". Among other things the initiative calls for work to begin on establishing a worldwide network of protected areas in which biological diversity is particularly rich ("hot spots"). In this way it is hoped that as high a proportion as possible of global biological diversity can be more effectively preserved. The Federal Government will continue to seek support for this proposal, in particular at the 4th Conference of the Parties to the Convention on Biological Diversity in Bratislava in May 1998.

Tourism

There has been an enormous boom in tourism throughout the world. This development is increasingly affecting sensitive and semi-natural areas, especially coastal and mountain regions. The number of German travellers visiting long-distance international tourist destinations is very high by international comparison. The objective of German initiatives at international level is to use the Convention on Biological Diversity as a central instrument for developing international principles and guidelines for sustainable tourism. An important step in this direction was taken in March 1997 with the "Berlin Declaration: Biological Diversity and Sustainable Tourism" adopted by an international conference of environment ministers (cf. Chapter 5.9.2).

3.5 Achieving objectives and implementing models

In a democracy it is crucial to have the cooperation of all parties involved and affected when developing and implementing a policy of sustainability. It is only by successfully reconciling the different interests in a pluralistic society like Germany that the conservation and sustainable use of biological diversity will be possible in the long term.

The most important actors in Germany among whom such a consensus must be reached include not only the political decision-makers, their executive organs, i.e. the administrative authorities at Federal, *Länder* and local levels, and the owners or entitled users of land, but also other interest groups within society, represented in the form of non-governmental associations and organisations.

In Germany there are already a large number of initiatives and programmes on which future efforts to continue implementing the Convention can build. Below is a list of just some of these initiatives:

Government working parties

- *Länder* Working Party on Nature Conservation, Landscape Management and Recreation *(Länder-Arbeitsgemeinschaft Naturschutz, Landschaftspflege und Erholung);*
- *Länder* Working Party on Water *(Länder-Arbeitsgemeinschaft Wasser);*
- Working Parties on the Elbe, Weser and Oder *(Arbeitsgemeinschaften zu Elbe, Weser und Oder);*
- Federal-*Länder* Working Party on Land Consolidation *(Bund-Länder-Arbeitsgemeinschaft "Flurbereinigung"; Arge Flurb);*
- Federal-*Länder* Working Party on Conservation of Forest Genetic Resources *(Bund-Länder-Arbeitsgemeinschaft "Erhaltung forstlicher Genressourcen");*
- Federal-*Länder* Working Group on Environmental Information Systems *(Bund/Länder-Arbeitskreis "Umweltinformationssysteme");*
- Federal-*Länder* Working Group on Cross-Sectoral Environmental Legislation *(Bund/Länder Arbeitskreis "Fachübergreifendes Umweltrecht");*

Scientific advisory committees and institutions concerned with biodiversity issues

- Council of Environmental Advisers *(Rat von Sachverständigen für Umweltfragen;* experts advising the Federal Government on the environmental situation and environment policy in Germany);
- Scientific Advisory Council on Global Environment Change *(Wissenschaftlicher Beirat für Globale Umweltveränderungen;* experts advising the Federal Government on global environmental issues);
- Advisory Council on Nature Conservation and Landscape Management *(Beirat für Naturschutz und Landschaftspflege;* experts advising the Federal Environment Ministry, BMU);
- Study Commissions of the *Bundestag*, such as the one on Protection of Man and the Environment *(Schutz des Menschen und der Umwelt),* i.e. *Enquete-Kommissionen des Bundestages* providing expert advice to Parliament;

- German Forest Management Council *(Deutscher Forstwirtschaftsrat;* advising the Federal Ministry of Agriculture, BML);
- Federal Office for Nature Protection *(Bundesamt für Naturschutz;* Federal authority within the BMU's portfolio);
- Federal Environmental Agency *(Umweltbundesamt;* Federal authority within the BMU's portfolio);
- Federal Research Centre for Forestry and Forest Industry *(Bundesforschungsanstalt für Forst- und Holzwirtschaft;* within the BML's portfolio);
- Braunschweig-Völkenrode Federal Research Centre for Agriculture *(Bundesforschungsanstalt für Landwirtschaft Braunschweig Völkenrode;* within the BML's portfolio);
- Federal Institute for Crop Breeding Research *(Bundesanstalt für Züchtungsforschung an Kulturpflanzen;* within the BML's portfolio);
- Federal Biological Institute for Agriculture and Forestry *(Biologische Bundesanstalt für Land- und Forstwirtschaft;* within the BML's portfolio);
- Federal Research Centre for Fisheries *(Bundesforschungsanstalt für Fischerei;* within the BML's portfolio);
- National Committee on Research into Global Change *(Nationales Komitee für Global Change-Forschung* (NKGCF); joint committee of the BMBF and *Deutsche Forschungsgemeinschaft* (DFG) providing scientific advice).

Initiatives to support the Rio process

- Environment and Development Forum *(Forum Umwelt und Entwicklung;* coalition of German environmentalist and development organisations supporting and critically reviewing the Rio follow-up process);
- National Committee for Sustainable Development *(Nationales Komitee für nachhaltige Entwicklung;* discussion forum comprising groups from the political, business and social spheres chaired by the BMU);
- Initiative of the BMU entitled "Steps towards sustainable, environmentally sound development - Environmental objectives and central areas of action in Germany" *(Schritte zu einer nachhaltigen, umweltgerechten Entwicklung - Umweltziele und Handlungsschwerpunkte für Deutschland)*. Between June 1996 and June 1997 six working groups, bringing together a total of some 130 governmental and non-governmental institutions and associations, drew up a joint discussion document to serve as one of the foundations of a "priority programme" in the environmental protection and nature conservation field, which the BMU is to complete by spring 1998. The working group on "Preserving the Ecological Balance" *(Schutz des Naturhaushalts)* dealt, in this context with concepts on the conservation and sustainable use of biological diversity;
- Initiatives to implement the "Local Agendas 21". These present a great opportunity to motivate a large number of actors from different levels in society to actively support sustainable development and, in particular, serve to support the local authorities in their efforts. Since the public often identifies strongly with developments occurring directly in the local community, these initiatives are particularly likely to raise awareness among ordinary people. While respecting the independence of local government as guaranteed under the constitution, the BMU attaches great importance to the task of supporting and pushing forward the Local Agenda 21 process through dialogue with all the relevant actors. The BMU and the Federal Environmental Agency are therefore assisting the local implementation process of Agenda 21 by, for instance, promoting various pilot schemes and research projects and providing a wide variety of materials and booklets. In the last few years numerous German towns and communities have taken up the Rio process by moving towards sustainable and environmentally sound development and are pushing ahead with appropriate activities. In future, greater use should be made of the opportunity to integrate activities for the conservation and sustainable use of biological diversity within the overall framework of a "Local Agenda 21".
- The BMU and local government associations plan to jointly prepare written guidelines to improve the way in which the objectives of the Convention and of nature conservation are incorporated in the Local Agendas 21. Such guidelines already exist for the sphere of climate protection in relation to the Local Agenda 21 process. These guidelines are intended to show the local authorities and all actors within Local Agendas 21 ways in which, in particular, aspects of conservation and sustainable use of biological diversity can be pursued more vigorously at local and municipal level. They may, for instance, contain specialist information and practical tips on developing local authority programmes to implement the Convention on Biological Diversity.

4. Fields of action and overall strategic concept

This chapter provides a brief summary of the gaps that exist between the current biodiversity situation in Germany and the objectives and models outlined in the previous chapter. It also presents an overall strategic framework designed to help close these gaps.

4.1 Fields of action on conservation and sustainable use of biological diversity

4.1.1 General review of threats to biological diversity in Germany

In some sectors, the efforts undertaken to achieve the conservation and sustainable use of biological diversity in Germany have, to date, been inadequate. Biological diversity continues to be threatened by a whole number of activities and processes. The threat posed to all three aspects of biological diversity in Germany, i.e. the diversity of ecosystems, species and genetic material, is relatively well documented.

Lüneburg Heath, Dietzmoor (upland moor)

Threats posed to ecosystems

Of the many different types of terrestrial and marine biotope, more than two thirds - measured against the reference period of approximately 100 to 150 years ago - are now endangered. 15% are already threatened with total destruction. Of these, 60% are considered completely or virtually beyond regeneration. Marine and coastal habitats are particularly at risk. Only 6% of all types of biotope that occur are considered to be under no threat whatsoever. However, this group mainly comprises types which, from a nature conservation standpoint, are not particularly worthy of protection (such as intensively farmed areas, forests with imported tree species, mining and quarrying areas still in operation, park lawns), whereas only a very few ecologically valuable biotopes may be regarded as non-endangered. The process of habitat loss has particularly accelerated over the last few decades. For example, between 1950 and 1985, 57% of all wetlands disappeared in the old *Länder* (West Germany). On the other hand, total forest cover, on the territory of the old *Länder* alone, expanded between 1960 and 1993 by around 0.5 million hectares, although in heavily built-up areas there was some depletion of woodlands.

Bark beetle infestation leads to serious damage to spruce trees (Harz)

Depending on the habitat or ecosystem in question, these threats may emanate from a number of different sources, ranging from chemical and nutrient inputs (for instance into marine waters, inland aquatic environments and woodland ecosystems) or constructional and hydrological alterations to waterbodies, through to the intensification or change in land use and the abandonment of traditional uses (for instance in the case of mead-

ows and pastures, dry (xero-bromion) and semi-dry (messo-bromion) grasslands, dwarf shrub heaths, traditional orchards, and historical forest types).

Deciduous and mixed woodlands now cover 56% of the total forested area in Germany. The remaining 44% is given over to coniferous monoculture, in which less than 10% of the stand is made up of other species. War-induced clear-cutting led to large-scale reforestation with spruce and pine, especially in the post-war years when there was a shortage of other seeds and saplings. These species have the advantage of growing without difficulty on clear-cut areas and producing the first yield faster than deciduous trees. It will take many years to transform these stands into mixed formations appropriate to the sites concerned. There has been widespread planting of appropriate deciduous and mixed stands in recent years. Of course, coniferous stands may, in fact, be appropriate to certain sites.

The age structure of Germany's forests is rather unbalanced due to disasters and the consequences of war. 37% of stands are between 1 and 40 years old, 32% are aged from 41 to 80 years old, and 31% are older than 80 years. In commercially managed forests, natural ageing and decomposing phases are under-represented, so there is a lack of important temporary habitats for species dependent on old growth and dead wood. However, the proportion of stands over 80 years old did increase from a quarter to a third between 1960 and 1990 in the *Länder* of West Germany alone.

Pollutant and nutrient inputs into the forests currently exceed the amount that can be tolerated in the long run. This is impairing the vitality of woodland ecosystems. The artificial regulation of rivers and streams, the draining of marshlands, the practice of open-cast lignite mining and the lowering of the water-table have, in many places, led to the loss of now rare riparian, fen and marshland forests and other woodlands heavily dependent on groundwater. With the widespread abandonment of traditional forms of forest use, many coppice, composite and pasture forests have also disappeared.

[Contribution by the Federal Ministry of Food, Agriculture and Forestry]

Threat posed to species

Existing numbers of wild plant and animal species have fallen, especially over the last 50 years. This is made clear by the Red Lists, i.e. inventories, compiled by various institutions, of species that are extinct, no longer sighted or considered to be endangered (taken from those species that occurred in Germany around 1850). Red Lists so far compiled in Germany cover about a quarter of the above-mentioned species, including vascular plants, mosses, all classes of vertebrates, butterflies, grasshoppers and beetles. According to the Red Lists, the survival of around half of all vertebrates and approximately one third of ferns and flowering plants in Germany is now under threat. Up to 10% of species from individual groups are extinct or are no longer sighted. Moreover, there are some species and groups that were hitherto common and do not therefore appear in the Red Lists (for instance bird species typical of farming landscapes) but have, in recent years, suffered such a serious decline in numbers in Germany and elsewhere as to indicate a threat to these species.

Fire salamander

Woodland-based species are generally less endangered than species dependent on other ecosystems. Examples of the former are ferns and flowering plants or silvicolous amphibians and many tree-nesting bird species. Those species specialised in old growth and dead wood represent an exception, since they suffer from the unfavourable age structure of the forests. However, a growing scientific understanding of the ecological importance of dead wood, extensive cultivation and rationalisation of forestry, and the increased economic prosperity of large sections of the population has resulted in considerably more dead trees being left lying or standing in the forest than was the case several decades ago. Pollutant and nutrient inputs into the forests are proving particularly damaging for certain species (bark-associated mosses, lichen, mycorrhiza fungi, soil organisms).

Removal of landscape elements (before)

Removal of landscape elements (after)

The decline in species is mainly caused by the destruction, fragmentation, reduction, structural degradation and pollution of the natural habitats of wild animals and plants. These habitats have been impaired by such factors as:

- the building over, surface-sealing and fragmentation of land; at the beginning of the 1990s an average area of more than 70 ha per day was being claimed by infrastructure measures for human settlement and transport;
- the removal in the past of landscape elements such as coppices, hedges, shrubs and small waterbodies;
- the widespread pollutant and nutrient inputs from a variety of sources (e.g. industry, domestic households, small consumers, farms and traffic), especially into woodland and aquatic environments,
- the altering of the local water balance (e.g. lowering the water-table).

In comparison with these indirect causes of species depletion, direct causes, such as the selective removal from nature and deliberate damaging of plants and animals are less significant. Disease carriers brought in from outside (e.g. Dutch elm disease) as well as neophytes or neozoa may also pose a threat to species in specific cases.

Cow parsnip

The scale of the threat posed by expected anthropogenic changes in the global climate is hard to predict. The annual weather pattern and its dynamics, especially the extreme conditions, determine the competitive capacity of many species, especially those that are rare and highly specialised. The danger, therefore, is that the anticipated climate changes will place excessive strain on the ability of populations to adapt. As a result we can expect to see shifts in the range of plant communities, changes in their composition and the disappearance of certain habitats. The long-living forest communities are particularly susceptible to this danger. Most threatened of all will be those species that were already rare or have become rare.

As with the assessment of the impact of greenhouse gases, it is also difficult to forecast the consequences for flora and fauna of a depletion in the ozone layer

and the resulting increase in UV-B radiation levels. This development is, for instance, already regarded as one of the causes of the worldwide decline in amphibian populations.

"Genetic erosion" - the threat posed to genetic variety

Methodological difficulties and the limited data available mean that it is only in individual cases that the scale of the threat to genetic variety among wild species can be estimated. Based on findings made for certain species of animals and forest trees, we can expect that, as landscapes are increasingly divided up and habitats lost, certain species and groups of species will find themselves more and more fragmented and the gene flow will be interrupted. Genetic isolation often leads to the reduction of diversity within the populations. In addition, various anthropogenic influences (e.g. substance inputs) induce a special process of selection and also lead to an impoverishment of genetic variety. The ability to adapt declines, especially in small populations with low genetic variety, creating an enhanced risk of extinction. This is all the more likely if (due, for instance, to anthropogenic influences) environmental conditions change rapidly within the fragmented regions in which flora and fauna occur.

In earlier centuries many tree species lost substantial parts of their habitat as a result of woodlands being cleared to make way for farming. Moreover, the forests were often over-exploited in those days. The major afforestation programmes of recent centuries largely relied on spruce and pine, since these were robust enough to cope with the degraded conditions of cleared areas, and there was always plenty of propagation material available from these types. In some areas trees were also planted which were unsuitable in terms of species and origins. Excessive game populations present a regional danger to the process of natural rejuvenation. Pollutant and nutrient inputs place a burden on genetic variety. All these factors affect the genetic variety of forest trees by initiating an anthropogenic process of selection. Consequently, genetic variety is especially depleted in the areas strongly affected by these factors.

In the field of landscape cultivation, the planting of exotic native tree and shrub species, which has been practised over many decades, also deserves criticism, since it can lead to genetic contamination of wild plants. In order to conserve the wild species in their natural habitats, the Federal Nature Conservation Act requires official approval for the dissemination of exotic species in the open countryside. This also applies to taxa below the rank of species. One of the aims of this provision is to allow inner-species genetic variety to evolve without disturbance and assume regional characteristics, as required under the Convention on Biological Diversity. Evolutive processes must not be impaired by mixing up different populations of the same species.

In contrast to the generally meagre understanding of wild species, genetic variability among cultivated plants and domesticated animals is far better understood due to the important role they play in breeding.

The range of plant species being cultivated in Germany began to narrow over 100 years ago, especially as the expansion of trade made substitute products more cheaply available (e.g. colonial produce). At the same time local varieties began being replaced by selectively bred, higher yielding varieties.

This process had a particularly rapid and decisive impact on annual field crops (cereals, root crops, oil and protein plants). Where the genetic abundance has not found its way into varieties still used or has not been preserved in gene banks, it has already been lost.

It may be assumed that a certain proportion of genetic variety of vegetable species has also already been lost. However, traditional varieties have been preserved thanks to private vegetable cultivation in a large number of gardens and allotments, although no records of these exist. There is currently a tentative trend among commercial horticulturists to resume cultivation of some of the older vegetable species and to introduce new types and forms. There is a need for clarification in relation to licensing, cultivation and plant protection issues and the securing of markets (high financial risk.).

Orchard

As a result of the plantation system of fruit production, some 20 species dominate the fruit market in super-

markets throughout the EU. We can estimate that at least 1,400 varieties of apple still exist in Germany along with at least 1,600 other fruit varieties (predominantly pears, cherries and plums). These cultivars are mainly maintained and bred in traditional orchards (300,000 to 500,000 ha), in domestic gardens, along avenues, in the display orchards of the *Länder*, the Federal Institute for Crop Breeding Research *(Bundesanstalt für Züchtungsforschung an Kulturpflanzen)* and the Institute for Plant Genetics and Crop Science *(Institut für Pflanzengenetik und Kulturpflanzenforschung)*, along nature paths and in cultivar museums of the *Naturschutzbund Deutschland* (NABU), and of the *Pomologenverein* (an association of pomologists) and by local initiatives.

Grasslands in Germany are, to an extent, still autochthonous. However, the spectrum of grassland types has been markedly narrowed by the intensification of farming in many areas. The plants still occurring in moderately to intensively managed grassland associations are, for the present, relatively stable, due to the fact that many regions have seen a decline in the ploughing up of meadows, in cattle densities and in fertiliser use over the last few years. However, those grassland types and populations whose habitat is in the, now rare, dry (xero-bromion) grassland and marshland sites are endangered.

In the case of domesticated animals, many of the measures designed to achieve particularly rapid breeding success have often had the side effect of depleting genetic variety. The use of new biotechnological methods such as super-ovulation, embryo transfer, sex determination and cloning will bring further advances in breeding but is also likely to reduce genetic variety still further.

Concentration on just a few breeds has taken place among farm animals in general and among cattle, pigs and chickens in particular. Moreover, while the genetic variability between the remaining breeds may have widened, the variability within the breeds, which originally could clearly be seen in the colour and morphology of local breeds, has tended to narrow.

4.1.2 Fields of action for Germany in international relations

As a highly industrialised country, Germany is one of the world's leading exporting nations. Germany imports the bulk of many of its raw materials from other regions of the world. These imports include biological resources (for instance timber, certain foodstuffs, medicinal plants, and plant and animal-based pharmacological products) that are often extracted within the countries of origin in a manner which is non-sustainable and endangers local biological diversity. Another problem is that the benefits arising from the utilisation of genetic resources may not be adequately distributed (taking into account the local and indigenous communities in the country of origin), as the Convention calls for.

Germany therefore collaborates with a whole number of countries of origin in an effort to help them use their resources sustainably. Conservation and sustainable use of biological diversity form a special focus of Germany's economic cooperation (cf. Chapter 5.9).

Tourism is one of the leading and fastest growing industries worldwide. Germany's participation in international tourism is well above average in relation to the size of its population. Problems arise when tourism is organised in a manner which threatens biological diversity (e.g. by ruining coastal regions through excessive and inappropriate building activity or by destroying coastal habitats). By the same token, sustainable tourism can help to finance protected areas and preserve the countryside. Thus, working in cooperation with those countries that are popular tourist destinations, Germany is endeavouring to develop sustainable forms of tourism and, within the scope of the Convention on Biological Diversity, frame global agreements on ecologically and socially compatible tourism.

4.2 Recommendations on strategy in the fields of action

4.2.1 General approach

Basic recommendations are intended to show a way of achieving the goals and objectives defined in the previous chapter. These recommendations are not conceived as rigid rules but must be formulated flexibly enough to enable them to be implemented through different measures adapted to the prevailing situation in each case.

In Germany, the basic conditions for implementing these recommendations are already very promising in many spheres and policy sectors. Existing initiatives for treating the components of biological diversity in accordance with the objectives of the Convention must be systematically pursued, strengthened and sup-

plemented by new measures. Under this approach, existing activities and measures, such as those described in Chapter 5, must be understood as an integral part of an overall strategy. They clearly demonstrate that, in Germany, there is already a wide spectrum of activities, representing a considerable potential on which to build. However, the cross-sectoral efforts must be linked up far more effectively and people must be made more aware, at all political and social levels, of the Convention and its importance.

The Convention recognises that widely differing fields of human activity have an impact on biological diversity and that the threat to biological diversity can only be countered through the concerted effect of measures introduced in these different fields of action. This means that any strategy defining the way to achieve the Convention's objectives must not only formulate issue-related and sector-related recommendations for action, but also identify cross-sectoral options for action. To achieve the objectives of the Convention it is therefore crucial that these goals be integrated into different spheres, with everyone jointly contributing to their achievement.

4.2.2 Cross-sectoral strategic framework

The strategic recommendations set out below are intended to form a framework that transcends the existing policy spheres (sectors). They are directed primarily at the various government departments at Federal level, but may also apply at all levels of political and social decision-making and goal-determination.

1) Actors in the political and social sphere

Actors in all spheres whose activities influence biological diversity shall accept the responsibility this entails.

To this end, they must become aware of the extent of the impact of their own activities on existing biological diversity and translate this awareness into plans for the future treatment of biological diversity. Suitable means of going about this may include:

- an examination, along the lines of an "eco-audit", of how their own actions affect and influence the components of biological diversity,
- the development of sectoral strategies for the future treatment of components of biological diversity in individual spheres (where this has not already been done).

2) Coordination

Among the actors - be they governmental or non-governmental - efforts shall be made to achieve closer coordination and integration of activities in order to create synergies and, wherever possible, avoid counterproductive actions at an early stage. In addition to improving the coherence of individual policy spheres with a view to achieving the objectives pursued here, it is also important to strengthen cooperation between the governmental and non-governmental institutions in the individual sectors.

3) Programme of work

Using existing coordinating mechanisms, the different actors shall always examine the influence cross-sectoral policy spheres and framework conditions have on existing biological diversity. In so doing, they should, for instance, address the following aspects, which are crucial to the treatment of biological diversity:

- development of and agreement on specific models and quality targets for managing biological diversity;
- examination of the impacts of important spheres of economic, financial and fiscal policy on biological diversity and identification of possible means of influencing them;
- the possible means of creating positive market-oriented incentives for conservation and sustainable use of biological diversity as well as abolishing disincentives which endanger biological diversity; a first step is to review the assistance programmes and subsidies available under various government departments at Federal and *Land* level that have an impact on biological diversity;
- the use of international financing instruments in which Germany participates and enjoys powers of codetermination.

4) Raising social acceptance

Initiatives and programmes with aims that completely or partly correspond with the objectives of the Convention shall be more closely linked so as to promote the process of consciousness raising and participation among the public. In the context of public debate, a similar amount of attention must be devoted to the problems surrounding "biological diversity" as is devoted to climate change. The relevant actors should make

greater use of existing initiatives with this aim. This concerns the following activities in particular:

initiatives on Local Agendas 21,

- integrating the issues of conservation and sustainable use of biological diversity in the performance of "eco-audits" in the relevant spheres, where this is not already being done,
- cross-sectoral initiatives endeavouring to develop a joint approach to tackling problems. Examples include concepts for integrated planning at the regional and Land levels, "round tables", landscape management associations and, at national level, the existing National Committee for Sustainable Development.

5) Improved consideration of the basic precepts for action

The precepts for action defined in the previous chapter, i.e. the principle of precautionary action, the polluter-pays principles and the principle of cooperation, must be given greater consideration in the treatment of biological diversity. To this end, efforts must be made within the scope of all relevant discussion fora and coordinating mechanisms to resolve the following problems of methodology:

- How, when applying the principle of precautionary action, can greater consideration be given in human activities to the future (especially medium and long-term) consequences of a threat to biological diversity?

  An important prerequisite is the development of an appropriate systems of indicators allowing reliable conclusions to be drawn about the state and development of biological diversity. These findings are then related to the influences of various human activities.

- How, when applying the polluter-pays principle, can both the external costs of a threat to biological diversity and the contributions made to improving biological diversity be better integrated into cost calculation in a free market system.

  This necessitates, among other things, the development of appropriate valuation and cost-accounting mechanisms, as well as the adjustment of key economic indicators such as gross national product, so that the value of the components of biological diversity can be more adequately reflected in monetary terms. National accounts will have to be revised in accordance with ecological considerations, thus giving the market the right signals and also making publicly clear that biological resources cannot be used for free. Where certain aspects of biological diversity cannot be registered by traditional methods of economic accounting, qualitative valuation must be considered as a device to help integrate them into the decision-making process.

- More respect for the principle of cooperation must be created by making the potential actors aware, to a degree not yet reached, of the existence of a common problem (the threat to biological diversity) that can only be solved through a common effort. This demands reliable information on the state of biological diversity and on the effect of human action upon it, along with appropriate educational campaigns and training measures in all sectors of society to show where the responsibilities lie in each case and what contributions can be made by the various social, political and economic groups towards meeting the objectives of the Convention. Moreover, cooperation with the affected and interested parties on the spot must also be strengthened so that they can be motivated to pursue these social objectives and to use their knowledge to this end.

5. Activities and programmes

This chapter provides an overview of existing measures and activities serving to implement the Convention. They represent the basis of the strategic recommendations for action outlined in the previous chapter and those to be developed in the future.

5.1 Recording and assessing biological diversity

The measures to conserve biological diversity and use it sustainably are based on:

- collecting data on the state of nature and the landscape and analysing that data,
- long-term monitoring of changes in nature and the landscape (environmental monitoring) by means of regular surveys,
- combining information from various measurement networks, long-term monitoring studies and environmentally relevant statistics,
- evaluation of the data.

The Federal Government has at its disposal a range of information systems and facilities that supply the data required for surveying and assessing nature and the environment with increased efforts being made to develop and coordinate them.

In addition, numerous programmes to survey and assess developments in nature and the environment, each with its own thematic and regional reference point, are being carried out by *Länder* authorities, by associations and private individuals, and by research institutions. Key instruments and foundations for this work include:

- inventory and mapping surveys of species and groups of species, biotic communities, biotopes and biotope constellations, as well as the compilation of Red Lists to gauge risk levels; this work is performed at Federal and (partly in accordance with standard Federal or EU criteria) *Länder* level, as well as for various regional sectors;
- long-term landscape-based environmental monitoring at national level by means of the "ecological site samples" surveyed in connection with integrated environmental accounting prepared by the Federal Statistical Office in cooperation with other partners. This pilot project, which is funded by the Federal Ministry of Education, Science, Research and Technology *(Bundesministerium für Bildung, Wissenschaft, Forschung und Technologie; BMBF)*, identifies and records landscape quality features using randomly selected permanent observation sites and delineates and describes biotopes. The findings are then given greater depth by surveying animal and plant species. The results can be used in drawing up Red Lists, appraising the impact of different uses, and determining the state of the landscape;
- registers of areas of European importance for nature conservation as part of the CORINE pilot project on nature conservation and environmental protection, which was launched by the European Community in 1985 and has now been completed in Germany;
- the Federal Forest Inventory (survey of forests based on forestry parameters, employing a standard sampling procedure for the whole country, with 1 October 1987 as the reference date in the old (western) *Länder*; figures for the new *Länder* are derived from the databases of the forestry agencies there);
- monitoring in forests to establish tree and soil conditions on the basis of a systematic sampling grid (level I) and permanent observation sites (level II);
- research into the genetic variety of forest tree and shrub species conducted under the auspices of the Federal-*Länder* Working Party on "Conservation of Forest Genetic Resources *(Erhaltung forstlicher Genresourcen)"*;
- collection of data on genetic resources for food and agriculture, for example breeding records (regular registration of population numbers of domesticated animal breeds), database for animal genetic resources in Europe at Hanover Veterinary University *(Tierärztliche Hochschule Hannover);* the GENRES Information System for Genetic Resources (also accessible via the Internet) at the Central Office for Agricultural Documentation and Information *(Zentralstelle für Agrardokumentation und -information, ZADI)* (concerned especially with plant and forest genetic resources);
- measurement programmes to monitor the quality of air and water as well as surveys of soil conditions; evaluation of pollution impacts, applying, for instance, the concept of "critical loads" (ecosystem-

based thresholds below which ecosystems can tolerate or neutralise the pollutant inputs, derived from research into causality and from environmental observation and then depicted spatially);

- the Federal Government and *Länder* are considering the introduction of "ecological monitoring of the environment" *(Ökologische Umweltbeobachtung)* as a kind of "ecological early warning system" designed to indicate long-term negative and positive trends in the functioning of the ecosystem. This would be run under the auspices of the Federal Environment Ministry and bring together the relevant environmental monitoring programmes of the Federal Government and the *Länder*. They include the Environmental Sample Bank, a Federal facility for collecting representative samples of air, precipitation and soil as well as plant, animal and human organs and providing storage in stable conditions to enable retrospective analysis of the impact of specific substances;
- the *Länder* collect further data as part of forest biotope mapping and forest functions mapping. This information goes into forest planning and helps to ensure that the concerns of species and biotope conservation are duly considered in forest management.

Surveying biological diversity in the *Länder* (examples)

Free State of Bavaria

An effective nature conservation policy requires reliable information on the current status of species populations, biotic communities and biotopes as well as their forms of interaction. This mission, which is contained *inter alia* in Agenda 21, is being carried out in Bavaria in a number of different ways.

In mapping species for conservation purposes, surveys are made of sites containing significant animal and plant species. Some 870,000 documented findings have so far been entered into the data base thanks to the cooperation of more than 1,000 experts. The Red Lists of endangered animal and plant species not only report population sizes and locations but also indicate the risk situation.

Biotope mapping provides an overall inventory of the ecologically valuable landscape components that still exist. Bavaria was the first *Land* in Germany to map biotopes covering the countryside und the Alps within a short period in 1974/75 and in 1976-79 respectively, producing 1:50,000-scale maps.

The mapping of urban biotopes began in 1976, and 32 towns have so far been completed. A programme to compile maps on a 1:5,000 scale has been running since 1985 and is providing a complete update. This work has been concluded in most areas apart from the Alps.

[Contribution by the Bavarian State Ministry for Regional Development and Environmental Affairs *(Bayerisches Staatsministerium für Landesentwicklung und Umweltfragen)]*

Nature reserve in Feldersee

Biotope-mapping in Baden-Württemberg

In Baden-Württemberg, two complete surveys have already been carried out to produce selective biotope maps on the scale of 1:25,000 covering the whole *Land.* The second biotope survey took place between 1981 and 1989. The areas mapped included open countryside and all the forests, while built-up areas were excluded.

The aim of this mapping programme was to record biologically and ecologically valuable biotopes in Baden-Württemberg. The intention was not only to identify biotopes meriting protection, in most cases for the mere purpose of for preparing the designation of protected areas and for developing concepts for these areas. Rather, the central objective was to draw up the most comprehensive inventory possible of valuable landscape components of the natural and cultivated landscape.

In selecting the biotopes to be mapped, the following assessment criteria were employed: naturalness, rarity, complexity, level of threat, representativeness, geological and cultural-historical significance, and importance to the natural scenery.

In selecting the biotopes, these criteria were not applied equally but carefully weighted. The *Land's* environment authority *(Landesamt für Umweltschutz Baden-Württemberg)*, which directed the work, almost exclusively commissioned cartographers who specialise in floristics and plant sociology. This ensured an essentially common approach to the selection and demarcation of biotopes.

As a result, 44,787 biotopes with a combined area of 466,406 ha (approx. 13% of the area of the *Land)* were mapped in this second survey of the Baden-Württemberg biotope mapping programme. Moreover, the populations of numerous species in these biotopes were selectively recorded.

The results of the biotope mapping surveys are widely used for nature conservation and environmental protection purposes. They are proving particularly useful in relation to practical nature conservation work, spatial planning and scientific studies.

This experience is being incorporated into the current process of mapping biotopes under special protection (Article 20 c Federal Nature Conservation Act) which is being carried out in the open countryside on a 1:10,000 scale by the *Land* forestry administration, following agreed mapping instructions.

[Contribution by the Baden-Württemberg Ministry for Rural Areas *(Ministerium Ländlicher Raum)*]

Cf. the contribution by *Naturschutzbund Deutschland e.V.* in the Annex: "Identification and monitoring by voluntary workers: the case of the *Naturschutzbund Deutschland e.V.* (NABU)"

While considerable progress has, in recent years, been made in monitoring and evaluating biological diversity, the task now is above all to strengthen efforts to make use of the existing data pool to facilitate the practical implementation of nature conservation measures.

5.2 Spatially relevant plans and procedures

Orientational and action frameworks for spatial planning policy

The goals and objectives of spatial development in Germany were agreed between the Federal Government and *Länder* and formulated in Guidelines for Regional Planning (1992). They were then elaborated for ten priority spheres in an Action Framework for Regional Planning, which was adopted as a medium-term programme of work and action by the Standing Conference of Ministers responsible for Regional Planning (MKRO; *Ministerkonferenz für Raumordnung)* in 1995. This framework attaches great importance to the aspects of land-use potential, steps to prevent suburban sprawl and measures to establish sustainable regional and settlement development.

An MKRO resolution was adopted on 27 November 1992 entitled "Development of an integrated ecological system in regional planning", which envisages a network of ecologically valuable sites. A cornerstone of the Action Framework for Regional Planning is "sustainable protection and development of the natural foundations of life, an objective that is elaborated in the MKRO resolution of 29 March 1996 entitled "Regional planning instruments to protect and develop the functions of open spaces". Taken together with the MKRO resolution of 8 March 1995 on the "Integration of the European network of special protected areas into the ecological networks of the *Länder* pursuant to the Habitat Directive", this establishes the underlying concepts for strengthening the ecological thrust of regional planning policies.

Sustainable spatial development requires that the social and economic pressures on an area be brought into line with its ecological functions. The aforementioned resolution argues that a basic requirement for achieving this balance is a conservation-oriented approach to safeguarding and developing open spaces in terms of their ecological functions coupled with a use-oriented management and coordination of the economic and social demands.

There is a need for new action-related instruments for open spaces requiring rehabilitation and development measures. The aforementioned resolution recommends that such spaces be designated in regional development plans as rehabilitation and development areas and calls for the elaboration of concepts for action. The ideas on regional planning instruments are taken up in

the Act Amending Regional Planning Legislation, while those on rehabilitation and development areas are being advanced through the experience gained in pilot projects.

A process of detailed elaboration is continuing at other planning levels. Local-level town and country planning has to be brought into line with these objectives of planning at Land level. In the sphere of local authority landscape planning, in particular, a very important basis has thus been created for ensuring that the local authorities take account of the local aspects of the Convention on Biological Diversity. A future focus of work should therefore be the implementation of existing landscape plans; this requires close coordination with land users. To this end, the communities can turn for support to, among others, the *Landschaftspflegeverbände*, since these voluntary countryside stewardship associations bring together local government politicians, farmers and nature conservation organisations, each with an equal voice.

Environmental protection and nature conservation in town and country planning

Providing comprehensive spatial planning at the local level, town and country planning has, in particular, the task of dove-tailing the demands of environmental protection and nature conservation and those of settlement development. This type of planning is regulated by the Federal Building Code. The amendments to the Code introduced by the 1998 Building and Regional Planning Act *(Bau- und Raumordnungsgesetzz* in force since 1 January 1998) provide for numerous improvements. The main emphasis of these improvements is to embody the principle of sustainability in parts of the planning process as a cornerstone of urban planning and, above all, to integrate environmental protection procedures and concerns into the town and country planning system. In particular, the provision under the Federal Nature Conservation Act governing intervention (see below) is now specified by the Federal Building Code in a definitive manner. The establishment of a nationwide system of biotopes and of the European system of ecological protected areas, Natura 2000, is supported by the widened scope for compensation with regard to areas and duration.

Sector plans

One of the instruments employed by the Federal Republic of Germany to protect biological diversity is that of **landscape planning.** It must be performed at the following levels of government administration:

- *Land* level = landscape programme,
- regional level = framework landscape plan,
- local authority level = landscape plan / green spaces development plan

The Federal Nature Conservation Act and the nature conservation acts of the *Länder* stipulate that landscape planning should present the measures and prerequisites for achieving the objectives of nature conservation and landscape management for a given planning area. The landscape plan provides town and country planners with the necessary planning foundations and assessment criteria for integrating aspects of landscape management and ecology, so that the relevant nature conservation concerns can be properly considered when coordinating land-use demands. Due to the nature of the division of powers under Germany's federal system, the arrangements governing the content, procedure and binding force of landscape planning may vary from one *Land* to another. Considerable differences can be especially found in relation to the legal status of planning at the local authority level. Thus, in some cases the landscape plan is itself an instrument with binding legal force, in others it may be integrated into local authority building regulations, while in yet other cases it can take the form of sector planning of an advisory nature - and each with differing arrangements for inclusion in town and country planning.

Nature reserve in Freudental, near Witzenhausen

The **intervention provision** stipulates that the party causing any interference in nature that may significantly or lastingly impair the efficiency of the ecosystem or degrade the natural scenery is obliged to refrain from creating any avoidable degradation of nature and the landscape. Unavoidable interference must be made good in such a way that no considerable or lasting im-

pairment to the ecosystem is left behind and the natural scenery is restored or reshaped in a manner appropriate to the landscape. Where the impairment cannot be avoided or cannot be made good as required and the concerns of nature conservation and landscape management have priority in the specific case, the interference must be prohibited. However, if the conditions for a ban do not pertain, approval must be given for the project concerned. In cases of interference that are regarded as priority projects yet cause impairment that cannot be made good, the *Länder* are empowered to enact further-reaching regulations, especially on compensatory measures or payments for damage incurred. The *Länder* have made use of these powers to varying degrees and in relation to different matters.

An important instrument for protecting biological diversity is the **Environmental Impact Assessment** (EIA) based on the EC Directive on the assessment of the effects of certain public and private projects on the environment (85/337/EEC) and the Act on the Assessment of Environmental Impacts *(Gesetz über die Umweltverträglichkeitsprüfung;* UVPG). The purpose of the EIA is the early and comprehensive identification, description and evaluation of the effects of projects on human beings, animals and plants, soil, water, air, climate and landscape, including their respective interactions, as well as on cultural and other physical assets. In other words, it is an instrument for precautionary environmental action. It is characterised by a holistic approach that takes into account all the environmental media.

The findings of an EIA must be considered when deciding on whether a particular project may be approved. An essential aspect of the EIA is the involvement of the public in the approval process. In Germany, EIAs are conducted in relation to all public and private projects that may have a considerable impact on the environment.

The original aim of **agrarian structural planning** was primarily to improve the situation of individual farms and forestry enterprises. This approach increasingly proved too narrow, and in 1995 it was decided to adopt a wider concept of agrarian structural development planning. This is designed, among other things, to improve the way structural policy on agriculture is coordinated with various other instruments for supporting rural areas and to regulate the competing demands on land use.

Articles 6 to 8 of the Federal Forest Act set out general provisions on **forestry framework planning** and safeguarding the forest's functions in relation to the plans and measures of agencies responsible for public projects. The details are determined by the *Länder*.

At all levels of public administration, whether Federal, *Länder* and local, there are a whole of number of other plans and procedures that also deal with various sectoral or spatial aspects.

Nature conservation in the conurbations of North-Rhine/Westphalia

The urban landscape of the Emscher-Lippe region, which has suffered extreme industrial overuse, is undergoing ecologically rehabilitation as part of an ecological programme entitled *Ökologieprogramm Emscher-Lippe* (ÖPEL). The guiding idea behind ÖPEL is to link the Emscher region with the remaining open spaces to the north and south of the conurbation (from the river Ruhr to the river Lippe) and to turn the Emscher and the Rhine-Herne Canal into a new post-industrial landscape park running from east to west. The main semi-natural areas covered by the programme are Cappenberger Wald, Eversumer and Westruper Heide, Hohe Mark and Dämmerwald. The whole programme region stretches to Wesel and Duisburg in the west, to the Ruhr in the south, to Hamm, Bergkamen, Kamen and Unna in the east, and to the Lippe in the north.

The measures and projects supported by ÖPEL include:

- the ecological redevelopment of the river Lippe,
- the creation of a regional, ecological network of open spaces,
- the conservation of valuable secondary biotopes, such as mining lakes and fallow brownfield sites, and measures to ensure landscape-appropriate recreational use.

An initial budget of DM 300 million has been made available to fund the programme from 1991 to 2001.

[Contribution by the North-Rhine/Westphalia Ministry for the Environment, Regional Planning and Agriculture]

"Nature and the countryside" in the Hesse 2000 *Land* Development Plan

Safeguarding and developing the natural foundations of life and using natural resources sustainably are important factors contributing to Hesse's attraction as a business location. They are indispensable to the quality of life in the local surroundings and the prospects for economic development. Efforts to protect, manage and develop the ecosystem, the countryside and natural resources, not least as a basic requirement for human survival, should pursue medium and long-term policy objectives that must be integrated into different planning levels. Among the policy objectives for the countryside planning sector, the Hesse 2000 *Land* Development Plan stipulates the following goals:

- the selection of sites whose ecosystem is intact or largely unimpaired and which are large enough for that ecosystem to remain viable, on which - in order to preserve the balance of nature - all other uses are prohibited, undisturbed natural development promoted and existing damage remedied;
- natural assets that cannot be renewed or can only be renewed with difficulty may only be used if other concerns predominate and there are no alternatives;
- the protection and development of semi-natural habitats must be ensured through compulsory arrangements for sites covering an appropriate proportion of the *Land's* surface area (approx. 10%) and its area of standing waters (approx. 20%); where this can be guaranteed through binding agreements with the relevant landowner or user and no threat to the land exists, no formal protective designation need be made;
- an integrated ecological approach is to be adopted in securing a functionally contiguous network of ecologically important green spaces that will reduce the isolation of biotopes and whole ecosystems;
- overdevelopment of the countryside through suburban sprawl is to be prevented.

[Contribution by the Hesse Ministry of the Interior and of Agriculture, Forests and Nature Conservation *(Hessischer Ministerium des Innern und für Landwirtschaft, Forsten und Naturschutz)*]

Integrating the objective of conserving biological diversity into existing and future plans: the case of the Saarland

The Saarland's Countryside Programme contains guidelines for, among other things, the selective conservation and promotion of:

- ecologically valuable grassland resources of special relevance to species diversity,
- traditional forms of land use (traditional orchards, unlevelled fields on hummocks and undulating ground),
- endangered local domesticated breeds for the conservation of genetic resources,
- copses and isolated woods in cleared farming landscapes.

The entire mosaic of succession in woodland communities as well as the conservation and/or restoration of a wide range of species is to be promoted by designating natural woodland enclosures not used for forestry and also model forest areas (managed in accordance with an ecosystem-oriented forestry concept) as protected sites.

The Framework Landscape Plan (currently under preparation) provides for selective spatial and site-related measures to protect and promote the diversity of ecosystems, the genetic variety of species in general and biological diversity in built-up areas.

In the Species and Biotope Protection Programme (currently under preparation) special consideration is given to plans for an integrated biotope network.

Special species protection measures and species support programmes focus on particular species or groups of species (for instance: a transboundary bat conservation programme run in cooperation with the *Länder* of North-Rhine/Westphalia and Rhineland-Palatinate as well as with France and Belgium; an amphibians protection programmes).

[Contribution by the Saarland Ministry of the Environment, Energy and Transport *(Ministerium für Umwelt, Energie und Verkehr)*]

Burnets (Zygaena loti)

5.3 Protection and conservation of habitats

A core component of Germany's efforts to conserve biological diversity is the site protection provided for habitats by placing remaining natural and semi-natural parts of the countryside under protection and by linking them up to form a network. These measures are designed to respond to the specific needs of the species that occur on such sites. To safeguard these sites, the Federal Nature Conservation Act lays down a number of categories for protected areas (see below). The responsibility for designation of these protected areas falls within the remit of the *Länder*.

In addition to the protection categories laid down in the Federal Nature Conservation Act, there are other protection instruments that are relevant to the safeguarding of biological diversity. They include, among others, the Natural Woodland Reserves *(Naturwaldreservate)* and other protected woodland areas. Alongside the legally established possibilities for protecting sites, a wide range of measures are being carried out on the basis of government assistance schemes and/or contractual arrangements.

Various protection instruments have been developed at international level within the scope of conventions (for examples Wetlands of International Importance, Biosphere Reserves). The nature conservation directives of the European Union (Birds Directive, Habitat Directive) contain binding obligations to designate special protected areas (Natura 2000 areas). To ensure implementation in Germany of these agreements and European regulations, such areas are, in many cases, protected under national law. However, neither of these two directives have yet been adequately implemented. In particular, the *Länder* have so far registered too few protected areas for Natura 2000.

Old bed of the river Rhine near Lampertheim

Sometimes one and the same area may fall into several categories. Thus, some National Parks in Germany are also part of a Biosphere Reserve. Indeed, some areas combine even more legal protection categories. On the other hand, there are others, such as certain sites designated under the RAMSAR Convention as Wetlands of International Importance, that receive no government protection at all.

5.3.1 Protection of sites and areas under German law

National Parks *(Nationalparke)* are expansive protected areas which must be kept in a state that is influenced by human activity either only slightly or not at all. Since responsibility for these lies with the *Länder*, the existing National Parks in Germany are not assigned to a unitary authority.

At present, the 12 National Parks in Germany make up approx. 2% of the country's surface area (although about 80% consists of stretches of water and mud-flats along the North Sea and Baltic Sea coasts). Within the existing system of National Parks, some widely representative ecosystem types and natural areas are conspicuous by their absence.

National Parks in the Wadden Sea: the case of the *"Nationalpark Hamburgisches Wattenmeer"*

A large part of the Wadden Sea *(Wattenmeer)*, an expanse of tidal flats on the southern shores of the North Sea which are periodically exposed at low tide, lies within Germany's borders. The Wadden Sea is not only enormously important for migratory birds and as a breeding ground for many species of fish, but it is also used intensively for economic purposes (e.g. fishing and tourism). Three *Länder* (Schleswig-Holstein, Hamburg and Lower Saxony) have each set up National Parks in their respective sections of the Wadden Sea. Since the Wadden Sea, stretching from the Netherlands to Denmark, must be regarded as a single habitat, cooperation takes place not only between the three Wadden Sea National Parks, but also internationally at trilateral level, coordinated by the Joint Wadden Sea Secretariat in Wilhelmshaven.

With regard to biological diversity, the basic aims of the *Nationalpark Hamburgisches Wattenmeer,* which has been in existence since 1990, are:

- the conservation of the tidal-flat habitats along with their natural dynamics, both for their intrinsic value and as a home to the species and biotic communities dependent on them,
- the protection of species and biotic communities from degradation,
- the development of the original dune and salt vegetation where it has been depleted.
- The measures to attain these goals include above all:
- protection of nesting places and colonies by controlling access and visitor flows and informing visitors,
- renaturation of dike foreland margins,
- promotion of more extensive agriculture on grasslands,
- ban on hunting,
- restrictions on fishing.
- development of a National Park Plan.

[Contribution by the Environment Authority of the Free and Hanseatic City of Hamburg *(Umweltbehörde, Freie und Hansestadt Hamburg)*]

All together, there are almost 5,000 **Nature Conservation Areas** *(Naturschutzgebiete)* comprising some 2% of Germany's surface area. However, the quality and the size of individual Nature Reserves is frequently inadequate, with the result that they cannot always properly fulfil their protective function. Future activities should therefore include the development of an effective biotope network.

Protected areas in conurbations: Berlin

In addition to the semi-natural Nature Conservation Areas in the outlying districts of Berlin, a special feature of inner-city districts is what is known as the "second-hand nature reserve".

The destruction that occurred during the Second World War allowed a specifically urban type of biotope to develop in many cities on unreconstructed rubble-strewn plots, peripheral railway land and disused industrial sites. Due to the special political circumstances surrounding Berlin over five decades, areas of inner-city wasteland were able to develop into extremely precious habitats for plants and animals.

The *Schöneberger Südgelände* was once the location of a rail freight depot, but with the closure of the depot 30 to 40 years ago it became wasteland and was successively reclaimed by nature. The man-made topography of the depot grounds offered a rich mosaic of the most varied terrain on which a diverse landscape emerged. Dense thickets of wood are interspersed with open patches of brightly flowering shrubs and grassy areas. In particular, the larger and well-developed dry grassland areas deserve special mention as habitats for rare fauna and flora. The process of succession (woody plants invading grasslands) demands active stewardship to preserve the valuable dry grasslands.

Flugplatz Johannistal was the first ever runway-type airfield, in Germany. After several decades of military use, it was closed at the end of the Second World War. It was then used extremely extensively and this allowed expansive dry and semi-dry grasslands to emerge along with specialised fauna. In the immediate vicinity of the former airfield work is due to begin in the next few years on the construction of a new "science and business city" as well as housing for 15,000 people. The unusual fauna of the old airfield is already being successfully advertised as a positive locational factor.

The major feature of both sites is not only their extraordinary population of rare and endangered plants and animals, but also the fact that, by virtue of their inner city location, they represent "biotopes on the door-step" offering Berliners first-hand experience of nature and thus stimulating understanding and support for measures to conserve biological diversity. On both these sites, comprehensive environmental education work and public involvement in the development, stewardship and use of these areas are crucial to their long-term conservation.

[Contribution by the Berlin Senate Authority for Urban Development, Environmental Protection and Technology *(Senatsverwaltung für Stadtentwicklung, Umweltschutz und Technologie, Berlin)*]

More important than the Nature Conservation Areas in terms of overall size are the roughly 6,000 **Landscape Reserves** *(Landschaftsschutzgebiete).* These cover an area amounting to a quarter of Germany, though they overlap in some cases with Nature Parks. Their protection status is lower that of Nature Conservation Areas and a greater degree of human activity is permitted.

Röthelmoos

Nature Parks (*Naturparks*) do not represent a separate protection category as such, since they can be safeguarded under the arrangements for Nature Conservation Areas and Landscape Reserves. In the old (western) *Länder*, they are intended primarily for development as recreational areas rather than nature conservation purposes. However, nature conservation is given higher priority in the Nature Parks of the new *Länder*. At the end of 1996 there were 70 Nature Parks covering approx. 15% of the country's surface area.

Natural Monuments *(Naturdenkmale*) are unique creations of nature defined by statute. In most cases these are trees, cliffs, water sources, waterfalls and other individual landscape features.

Protected Landscape Components *(geschützte Landschaftsbestandteile)* are parts of nature and the landscape that are defined by statute as requiring special protection in order to ensure the proper functioning of the ecosystem, to enliven, structure or maintain the local and natural scenery, or to avert harmful impacts. In particular areas, protection may extend to the entire population of trees, hedges or other parts of landscape (e.g. reed beds, small waterbodies).

Coast at Klein-Zicker (Rügen Island, Baltic Sea)

Protected Biotopes *(geschützte Biotope)* enjoy blanket protection under Article 20c of the Federal Nature Conservation Act on account of their largely unimpaired natural state or the danger of degradation. In these biotopes, which may be bogs and fens, rocky and steep coastlines, marshy and riparian woods, or alpine meadows, any measures likely to cause destruction or substantial alteration are prohibited. In cases where exemptions are granted for measures taken in the public interest, orders may be issued for some of the damage caused to be made good. This Federal provision is interpreted in very different ways by the *Länder* in their own legislation.

Biosphere Reserves

In response to the UNESCO "Man and the Biosphere" programme (MAB, cf. Chapter 5.9.2), which has been running since 1970, some *Länder* have adopted nature conservation legislation providing for the protection category of "Biosphere Reserve". Biosphere Reserves are defined here as large-scale segments that are representative of natural or cultivated landscapes. They are sub-divided into zones and graded according to the in-

Sign – "Biosphere Reserve"

fluence of human activity. Model concepts for their protection, management and development are implemented jointly with the local communities resident in the Biosphere Reserves. These concepts are simultaneously intended to facilitate research into the relations between humankind and the environment and promote environmental observation and environmental education. Biosphere reserves therefore constitute model sites for the development of sustainable land use and conserving the species and breed diversity, such as domesticated animals and fruit cultivars (traditional orchard fruits), as required under the Convention on Biological Diversity. At present there are 13 Biosphere Reserves, all recognised as such by UNESCO. They cover 3.5% of Germany's surface area (including Wadden Sea areas, and partly congruent with the existing National Parks).

Rhön Biosphere Reserve (Bavaria, Hesse, Thuringia)

In the Rhön region, an outstanding expanse of the Central German Uplands, efforts are being made to bring the current forms of landscape use into harmony with the ecological conditions of this difficult and sensitive natural environment and thereby ensure the sustainable use of the Biosphere Reserve. The aim is to promote and continue established uses that have proved appropriate and, in particular, to open up new and viable prospects for the future, such as in the spheres of agriculture or tourism.

A cross-*Länder* and cross-sectoral framework concept (for the *Länder* of Bavaria, Hesse and Thuringia) was agreed upon at the end of 1994, following consultations with all the relevant local authorities, government agencies, associations and interested groups. It is an informal concept, containing above all guidelines for the sustainable development of the region. Exemplary projects include: model marketing initiatives in the agricultural sector, which have generated a revival in the regional economy through enhanced flows between farmers, craft enterprises, hotels and restaurants, and the tourist industry; and efforts to promote ecologically sound mobility by bringing regional railway lines back into service.

To improve species protection in the Rhön Biosphere Reserve, a framework for action is currently being prepared to integrate the goals, concepts and opportunities of zoological species protection efforts in this region. Particular significance is accorded to the identification of target species for the region, whose protection will achieve optimum benefits for the entire habitat. For instance, a package of measures (involving the removal of belts of spruce, re-routing of footpaths and stepping up of nature conservation surveillance) has resulted in the optimisation of habitat for black grouse.

[From information issued by the Hesse Ministry of the Interior and of Agriculture, Forests and Nature Conservation as well as by the Bavarian State Ministry for *Land* Development and Environmental Affairs]

Meadow of globe flowers in Rhön biosphere reserve

Woodland Protection Areas

Woodland Protection Areas have been established under forest legislation primarily in the state forests of the *Länder*. "Total reserves" (the actual designations, which differ between *Länder*, are *inter alia* Natural Forest Reserve *(Naturwaldreservate)*, Natural Forest Enclosure *(Naturwaldzelle)* and Closed Forest *(Bannwald)* are left to develop naturally and are used for the purposes of research, nature conservation and preservation of genetic resources, while also serving as sites for scientific comparison, demonstration and observation. The proportion of the total forest cover given over to Natural Forest Reserves throughout Germany comes to approx. 0.2%. No forestry measures at all are carried out in a total area of 83,000 ha of forest cover (Woodland Protection Areas under forest legislation and parts of Nature Conservation Areas, National Parks and Biosphere Reserves). There are also Woodland Protection Areas in which forest management is geared to specific protection goals. Among other things, these serve to preserve historical forms of woodland and rare forest communities.

Water Protection Areas

Federal and *Länder* legislation on water accords the competent authorities the power to designate, for the maintenance of certain protective functions, Water Protection Areas within which restrictions of use apply. Under the long-term plans of the water authorities in the *Länder*, it is intended to designate between 5% and 30% of the surface area of each *Land* as Water Protection Areas. Especially where there is a need to safeguard bogs, marshes or fen and swamp forest formations, Water Protection Areas provide a valuable instrument in addition to those protected areas designated under the nature conservation laws.

Large-scale federal nature conservation project "Wolfskopf"

5.3.2 Site protection by means of government assistance programmes, contractual agreements and other funding instruments

Large-scale Federal Government nature conservation projects

Since 1979 the Federal Government has been making funds available for the "establishment and safeguarding of valuable components of nature and the countryside that are of representative significance for the nation as a whole".

The aim of this funding is both the long-term improvement and protection of the ecological and conservational quality of large areas of natural and semi-natural landscape that are of outstanding national importance and display typical features of the natural assets of the nation as a whole. Grants are awarded to projects that help to conserve the natural heritage of the Federal Republic of Germany. The funds are mainly used for the purchase or long-term lease of land, financial compensation, management and development planning, and implementation of ad hoc measures to influence the development of biotopes. The Federal Government may contribute up to 75% of the total costs of a project. The remaining costs are borne by the respective *Land* and the executing agency.

The sites and areas concerned require and merit special protection from both a national and an international perspective. The purpose of safeguarding and developing these sites is to eliminate persistent threats and thereby prevent irreversible damage, especially the extinction of native plant and animal species.

Land acquisition was previously a major aspect of large-scale nature conservation projects undertaken by the Federal Government. However, the achievement of nature conservation objectives demands greater cooperation with land users, which in some regions is rendered more difficult by the purchase of sites. It is therefore now intended to revise the funding guidelines so that other key instruments for nature conservation will have equal priority alongside land acquisition. Large-scale Federal nature conservation projects can, in this way, contribute substantially to the creation of a Natura 2000 network.

Nature conservation programmes of the *Länder*

In addition to designating protected areas, the *Länder* have developed a whole host of nature conservation programmes to which the agriculture and environment ministries as well as the nature conservation foundations of the *Länder*, the district and local authorities, and non-governmental associations all contribute.

The following programmes are important for the country as a whole:

- Land purchase and leasing programmes for acquiring or leasing valuable pieces of land for the purposes of nature conservation and landscape management;
- Contract-based nature conservation: financial support for low-impact farming and for the implementation of management measures; the owner or entitled user enters into a contract with the nature conservation authority to comply with agreed conditions for land management and, in return, receives financial payments which largely compensate for any loss of income incurred. In this way, farmers and landowners become voluntary partners in nature conservation;
- Species conservation programmes (cf. Chapter 5.4).

Bat conservation in Hesse

For many years, bat conservation has played a prominent role in Hesse. It is therefore hardly surprising that the project to test and develop bat conservation strategies is being undertaken in this *Land*. The project, which is entitled "Creating a network of roost sites for building-dwelling bat species by safeguarding and enhancing the existing availability of roost sites on and in buildings", is designed to perform and test a whole package of measures to establish new quarters and, at the same time, create broad public acceptance by developing new forms of educational and awareness-raising activity.

[Contribution by the Hesse Ministry of the Interior and for Agriculture, Forests and Nature Conservation]

Compensation for managing difficult wetland sites in the Free State of Bavaria

In Bavaria appropriate financial compensation is available to owners or entitled users of land who are disadvantaged by having to practise non-intrusive farming, forestry or fisheries on wetland sites of special ecological importance (for example, litter meadows). The government of the Free State of Bavaria has to date spent a total of DM 57.53 million on these compensation payments and the conservation of valuable litter meadows.

[Contribution by the Bavarian State Ministry of *Land* Development and Environmental Affairs]

Bayerischer Naturschutzfonds

Founded in 1982, the *Bayerischer Naturschutzfonds*, i.e. the Bavarian nature conservation fund, is an independent public-law foundation devoted to the promotion of nature conservation measures and the provision of effective back-up for government action. In addition to the income from its assets of DM 25 million, the fund will in future also receive the interest gained on the investment of DM 100 million taken from privatisation revenues generated by the government of Bavaria. The foundation will provide annual grants of up to approx. DM 8.5 million for the implementation of nature conservation projects. Its primary aims are:

- assistance for purchasing and leasing sites and rights, taking on sponsorships,
- co-funding of dedicated project management, on-going back-up and permanent ecological monitoring in priority areas such as Biosphere Reserves,
- initiating the development of long-term utilisation systems appropriate to nature and the environment,
- research on specific issues of species and biotope protection,
- promoting public relations.

[Contribution by the Bavarian State Ministry of *Land* Development and Environmental Affairs]

Fallow land at Herschenbach (Westerwald)

5.3.3 Areas and measures in the European Union providing legally binding protection

Habitat protection is at the centre of the European Union's nature conservation policy, which is based on two Directives:

- the 1979 EC Directive on the conservation of wild birds (79/409/EEC), known as the "Birds Directive",
- the 1992 EC Directive on the conservation of natural habitats and of wild fauna and flora (92/43/EEC), known as the " Habitat Directive".

The EC Birds Directive, the EU's first ever nature conservation directive, is designed to improve and harmonise bird protection. It commits the Member States to setting up special protected areas, guaranteeing their management and, where appropriate, restoring them through ecologically appropriate development measures. The Directive also pursues the general aim of protecting all birds from direct human interference.

Practical steps towards habitat protection begin by notifying the European Commission of the areas concerned. Bird sanctuaries have, in most cases, been designated as such *(Vogelschutzgebiete)* under German nature conservation law, although some *Länder* have not yet done enough in this respect. As of 1997, 503 sites with a total area of approx. 8,600 km^2 have been registered in Germany. However, the current list cannot be regarded as sufficient, since some *Länder* have registered very few sites.

The Habitat Directive is one of the central instruments for fulfilling the obligations arising out of Article 8 of the Convention on Biological Diversity ("*In-situ* Conservation"). It obliges the Member States to establish a coherent European network of special protected areas, under the name of "Natura 2000", made up of sites containing valuable types of habitat which are of EU-wide significance and species that are rare and endangered throughout the Community. This system of protected areas comprises all areas already designated under the EC Birds Directive and all areas to be designated in future under the Birds Directive and the Habitat Directive.

All projects and plans that may potentially cause significant degradation to an area in relation to its components required for conservation purposes must be subject to a special compulsory impact assessment and examined against specific permissibility criteria detailed in the Directive. The Habitat Directive stipulates that efficiency reviews be conducted in the sphere of nature conservation management, sets out monitoring obligations and lays down comprehensive reporting duties. Thanks to this appraisal at European level, a higher and more appropriate status is being accorded to the types of biotope that are characteristic for a particular region and occur there frequently.

Since 1992 the European Commission has been making Community funds available within the scope of the LIFE financial instrument for the environment. Grants awarded under LIFE's "Nature" section fund measures implementing the EC Birds Directive and the EC Habitat Directive.

The Habitat Directive lays down a binding timetable for implementing the Natura 2000 system of protected areas, divided into three stages. However, delays have occurred in the implementation of the Directive so that the completion of the first phase (national area reports to the European Commission), originally planned for June 1995, has been delayed by more than 2 years.

5.3.4 Measures under international conventions

Major international conventions in the field of nature conservation have the objective of protecting habitats and ensuring they are used in an environmentally and ecologically sound manner in accordance with the principle of sustainability.

Regional agreements within the scope of the Convention on the Conservation of Migratory Species of Wild Animals.

The regional agreements hitherto concluded within the scope of the Bonn Convention (cf. Chapter 5.4.4) contain, among other provisions, obligations concerning the protection and conservation of habitats. Thus, Germany, as a party to the Agreement on the Conservation of Bats in Europe, is obliged to safeguard roost-sites required for their conservation. The Agreement on the Conservation of Small Cetaceans of the Baltic and North Sea calls on the parties to identify areas of special importance to the survival of these populations and stocks, and expects Member States to implement protective measures in these areas.

Wetlands of international importance (RAMSAR)

The Convention on Wetlands of International Importance, especially as Waterfowl Habitats (RAMSAR Convention) obliges the signatory States to conserve and promote wetlands as the basis for the survival of large and species-rich plant and animal communities in these habitats.

There are now 31 sites in Germany (March 1996 figures), comprising a total area of 671,204 ha, registered with the Convention Secretariat. About 80% of this area consists of mudflats and expanses of water along the North Sea and Baltic Coasts. The Wadden Sea is the primary wetland area of international importance in Germany in view of its unique and still largely undisturbed habitats and its significance to bird migration. A large proportion of the wetlands of international importance now enjoy statutory protection.

World Heritage Sites

The International Convention concerning the Protection of the World Cultural and Natural Heritage (UNESCO World Heritage Convention), to which the Federal Republic of Germany acceded in 1976, is a framework for protecting monuments belonging to the cultural and natural heritage of mankind as well as historical landscapes. So far, only one area in Germany has been listed as a "World Natural Heritage Site". It is an excavation site at Messel in Hesse, renowned for its palaeontological finds.

Trilateral cooperation to protect the Wadden Sea

Germany, Denmark and the Netherlands have been working together since 1982 to protect the cross-border ecosystem of the Wadden Sea. In recent years a large number of decisions have been reached on ways of improving the protection of this globally important habitat at the triennial inter-governmental conferences.

The most important achievements of the 1994 Ministerial Conference in Leeuwarden were the establishment of trilateral protected areas within the trilateral cooperation zone, agreement to continue working on a joint management plan and the setting of ecological quality targets for joint activities in the cooperation zone.

The 8th Trilateral Governmental Conference on the Protection of the Wadden Sea in Stade on 21-22 October 1997 resulted in the Stade Declaration in which, among other things, the following declarations of intent were formulated:

- Adoption of the "Wadden Sea Plan"; this political declaration of intent lists the concrete goals of joint German-Danish-Dutch efforts to protect the Wadden Sea ecosystem, broken down into its various components (salt meadows, dunes, estuaries, tidal area, offshore zone, rural areas, landscape and culture, water and sediments, as well as birds and marine mammals). It also set out the measures and actions required to attain the goals and continuing trilateral projects to advance the state of knowledge;
- Earliest possible implementation of a trilateral monitoring programme designed to cover the parameters listed in an annex to the Declaration of the Ministers. This should make it possible for information to be provided at any time on the condition and development of the Wadden Sea;
- Coordination of activities for preparing the nomination of areas to be included in the coherent ecological European network of protected areas (Natura 2000).

Convention on the Protection of the Marine Environment of the Baltic Sea Area (Helsinki Convention)

Since 1974, the Baltic Sea States have been cooperating on the basis of the Helsinki Convention on the Protection of the Marine Environment of the Baltic Sea Area. Within the Environment Committee of the Helsinki Commission (HELCOM) a working group (EC Nature) was set up, devoted primarily to conserving biological diversity in the Baltic Sea region. The Federal Republic of Germany chairs this working group.

The following expert proposals put forward by the nature conservation working group had, by March 1997, been adopted by the Helsinki Commission:

- designation, outside discrete settlements, of a coastal strip to enjoy blanket protection for at a distance of at least 100-300 metres seaward and landward of the mean waterline to protect the immediate coastline from building development; and the establishment of a special 3 km-wide coastal planning zone;
- creation of a system of nominated Baltic Sea Protected Areas (BSPAs), partly offshore but predominantly inshore, of which there are 62 to date;
- advice and instructions on the identification and landside demarcation of coastal ecosystems influenced by the Baltic Sea;
- conservation of the natural morpho-dynamics of the Baltic coast and the coastal areas subject to flooding and calls for the development of integrated coastal management plans;
- advice and instructions on the selection and nomination of BSPAs and proposals for their classification in accordance with internationally binding protected area categories;
- measures to protect and continue research into the population of small cetaceans in the Baltic Sea;
- recommendation on the management and renaturalisation of wetland pastures and freshwater ecosystems as well as on the restoration of the natural water-table in fenland sites to retain nutrients.

Seagulls at the Wadden Sea (North Sea)

Moreover, at the level of its Environmental Committee, HELCOM has adopted:

- a list of types of biotope and natural area that are of special ecological value,
- advice and instructions for the management of BSPAs.

As part of the implementation of the HELCOM recommendations, shore protection strips have been established on the land slide in the two German *Länder* bordering on the Baltic Sea. In Mecklenburg/Western-Pomerania the strip is 200 metres wide, while in Schleswig-Holstein it was recently widened from 50 to 100 metres.

Of the eight BSPAs registered in Germany, two have been demarcated definitively and designated (the *Jasmund* and *Vorpommersche Boddenlandschaft* National Parks in Mecklenburg/Western-Pomerania). In both Mecklenburg/Western-Pomerania and in Schleswig-Holstein, projects to move dikes further inland in order to restore natural coastal areas subject to flooding are either planned or have already been completed. Moreover, all government coastal protection measures are set out in sector plans or in coastal management plans and financed under the arrangements of a Joint Federal-Länder Task *(Bund-Länder-Gemeinschaftsaufgabe)*. A Federal-*Länder* measurement programme to monitor the Baltic Sea has also been set up within the framework of such a Joint Task.

Convention on the Protection of the Marine Environment of the North East Atlantic

The Convention for the Protection of Marine Environment of the North East Atlantic (Paris, 1992) contains *inter alia* provisions "to protect the maritime area against the adverse effects of human activities so as to [...]conserve the marine ecosystems and, when practicable, restore marine areas which have been adversely affected". The Convention will enter into force by mid-1998 at the latest, replacing the Oslo and Paris Conventions for the Prevention of Marine Pollution. In preparation, the Commissions of Oslo and Paris have already set up a working group (IMPACT) with the task of identifying the human activities which are detrimentally affecting the marine environment, apart from the discharge of (hazardous) substances.

International Conferences on the Protection of the North Sea

After the Third International Conference on the Protection of the **North Sea** (The Hague, 1990) had taken the first steps towards extending cover to the protection of species and habitats, this issue was taken up with renewed vigour by the Fourth International Conference on the Protection of the North Sea (Esbjerg, 1995). The ministers agreed to undertake joint efforts towards the complete realisation of an EU-wide ecological network

of protected areas serving species and habitat protection (Natura 2000) in the coastal waters of the North Sea. In this context, it is also planned to refine the classification system for marine biotopes for the North Sea as a whole. The Conference laid down a list of measures to be developed and implemented if there is a threat to key species and their habitats that are ecologically important or crucial to biological diversity. The relevant work is being carried out within the scope of the above-mentioned Convention on the Protection of the Marine Environment of the North East Atlantic.

Pursuant to the agreements made at the Fourth International Conference on the Protection of the **North Sea**, the competent ministers, meeting at an Intermediate Ministerial Meeting on the Integration of Fisheries and Environmental Issues (Bergen, 1997), agreed to take appropriate measures to minimise the detrimental impacts of fishery activities on the living creatures in the North Sea and on their habitats. In particular, an ecosystem-oriented approach to the development and implementation of measures is to be taken here. This will involve identifying the processes in and influences on the ecosystem which are crucial to the maintenance of its characteristic structure and its function and to its productivity and biological diversity, as well as taking account of reciprocal relationships such as those between the various elements in the food web of the ecosystems (multi-species approach).

Alpine Convention

The Convention concerning the Protection of Alps (Alpine Convention) came into force on 6 March 1995. Its aim is to reconcile the many different demands on the sensitive habitats of the Alps. The Convention is further elaborated by implementing protocols (not yet in force) on important individual aspects. In Germany, responsibility for measures to implement the Alpine Convention lies with the Free State of Bavaria.

In the "Nature Conservation and Landscape Management" Protocol, the Parties undertake to protect, manage and, where necessary, restore nature and the landscape in the Alpine region, while giving due consideration to the interests of the local population. The necessary cooperation between the Parties is to be fostered. The Protocol contains provisions governing landscape planning, the assessment of the impact of particular measures on nature and the landscape, the establishment of systems of protected areas, the removal of and trade in particular animal and plant species, the re-establishment of native species, and research, education and information.

In the "Mountain Farming" Protocol, the Parties undertake to maintain and support site-appropriate mountain farming practices, operating on an environmentally-sound basis, and commit themselves to generally improving the living and working conditions of the farming community of the Alpine region.

Wetterstein range (Alps)

Nearly all the requirements referred to in the "Mountain Forest" Protocol have already been fulfilled by Bavarian legislation on forestry and other sectors as well as by current *Land* development programmes.

On the question of regional planning in the Alpine region, the Federal Government has reached agreement with Austria and Italy on the implementation of a joint pilot programme of action. This represents a contribution to the implementation, on a pilot basis, of the "Regional Planning and Sustainable Development" Protocol of the Alpine Convention in the eastern Alps.

Protocol of Environmental Protection to the Antarctic Treaty

Germany ratified the Protocol of Environmental Protection to the Antarctic Treaty in 1994. In order to pro-

tect the Antarctic environment, the Protocol provides for a whole number of graduated measures to be implemented in connection with activities by the Parties in the Antarctic (including reporting duties, approval procedures and environmental impact assessments). For its part, Germany is currently developing criteria for an environmental impact assessment and principles of precautionary action.

5.4 Protection and conservation of species

5.4.1 *In-situ* conservation of species

In situ s pecies protection is a "classic" field of activity for nature conservationists. In many cases it centres on major well-known species, which may in fact act as "key species" or "target species" for the conservation of the whole habitat in which they live.

The conservation of rare woodland species is an integral component of the concept of ecological forestry pursued by the forestry authorities in the *Länder*. Rare tree species are promoted by integrating their conservation into forest planning procedures, by giving them preferential treatment when managing forest stands or forest edges, by protecting their ability to rejuvenate and by increased planting.

Conservation and planting of rare forest tree and shrub species

The designation of conservation stands and ecologically valuable individual trees of rare or endangered forest tree species (fir, black poplar, elm, yew, wild service tree, true service tree, wild fruit species) and various shrub species is an important contribution to the conservation of these species in woodlands and hedges. In some cases, it is only by building up populations capable of reproducing themselves that these species can come to be more widely planted in the forest and countryside.

[Contribution by the Federal-Länder Working Party on "Conservation of Forest Genetic Resources" *(Bund-Länder Arbeitsgruppe "Erhaltung forstlicher Genresourcen")*]

It is the responsibility of the nature conservation authorities of the *Länder* to draw up species protection programmes. There is a great variety of approaches, methods and objectives. A considerable number of specialised species protection programmes are carried out using the instrument of contract-based nature conservation (cf. Chapter 5.3.2) and either in cooperation with or entirely by nature conservation associations. The measures carried out as part of agri-environmental programmes provide compensation to farmers participating in these schemes on a voluntary basis for income losses they incur as a result of restrictions on land management. In so doing, these measures also promote cooperation between farming on the one hand and species and nature conservation on the other.

Protection and conservation of the great bustard in Brandenburg

As a "bird of the steppe", the great bustard lives in expansive, open, farming regions in the eastern *Länder.* With the intensification of agriculture in the former GDR, its numbers fell dramatically and few now remain. In the *Land* of Brandenburg attempts are being made to improve the availability of food for chick-rearing by renaturalising the bird's habitat, which involves developing structurally diverse and species-rich vegetation to support a wealth of arthropod fauna. Protection of the great bustard requires constant long-term cooperation with farmers in the areas where great bustard populations are breeding. In 1996 over DM 1.8 million was made available from *Land* funds for farmers complying with land-use regulations negotiated with them. At present, the great bustard is not yet capable of surviving in Germany without such a management scheme.

The project has led to a positive population trend among various meadow-breeding birds, which are also benefiting from the measures.

[Contribution by the Brandenburg Ministry for the Environment, Nature Conservation and Regional Planning *(Ministerium für Umwelt, Naturschutz und Raumordnung)*]

***Land-wide* ecological assessment of game habitats in Brandenburg**

Using various criteria, such as winter grazing capacity, protective cover, disturbance, habitat frag-

mentation as well as the presence of wallows and watering places, a comprehensive survey of the quality of game habitats is being conducted for the first time throughout Brandenburg. This enables an estimate to be made of potential population sizes and the existing distribution of different game species. With this information it is possible, among other things, to plan selective game management measures, such as extending grazing access by planting, tending and recultivating deer pastures , deer meadows and browsing copses, by planting and promoting mast-bearing tree species and by deliberately opening up thicket complexes.

The danger to game posed by increased traffic volumes can also be reduced by using the survey to derive and implement proposals for installing game warning reflectors, roadside fencing, game crossing-points or new types of traffic control on busy motorway and road sections.

Moreover, when planning the construction and upgrading of roads, more detailed consideration will then be taken of game as a locational factor than before. This is particularly true of efforts to prevent game populations being concentrated within isolated pockets.

[Contribution by the Brandenburg Ministry of Food, Agriculture and Forests]

European pond tortoises

Conservation programmes for ground-nesting meadow birds

Particularly on the flat terrain of the Germany's northern *Länder*, meadows are a dominant landscape feature. They are used by a characteristic brooding community (ground-nesting meadow birds) and play a very important role as a resting biotope for migratory birds. In order to safeguard these areas and increase their present ecological value, it is crucial that land is used more extensively. A number of *Länder* are therefore running programmes to protect native ground-nesting meadow birds which carry out long-term contract-based extensification programmes in collaboration with the competent government agencies, local authorities and associations. Substantial funding is made available for this work. Whereas in some regions these efforts have succeeded in stabilising populations of ground-nesting meadow birds, in many places their numbers are still in decline, especially due to the sudden increase in birds of prey.

[Contribution by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety]

Conservation projects for the European pond tortoise and fire-bellied toad in Brandenburg

Also known as the swamp turtle, the European pond tortoise was, in historical times, once widespread in Central Europe. For a period it was a popular source of food. Since then, populations have collapsed in many places. The *Land* of Brandenburg is home to nationally important stocks of this once common species. In addition to ascertaining the status of this species and investigating the causes of its decline, the conservation measures also include steps to ensure that, in those waterbodies where tortoises occur, any weir-trap fishing will not harm the tortoises. In some places this poses various difficulties, so long-term solutions are being sought by establishing contractbased nature conservation arrangements. The nests, which are sometimes located some distance from the tortoises' aquatic habitats, also need protection. Efforts are being made to establish a network linking the remaining stocks in Brandenburg with the populations in Poland.

Another species that can be regarded as an "indicator" of the ecological quality of aquatic environments is the fire-bellied toad. In Brandenburg, an attempt is being made to establish a network linking up isolated populations and also to renaturalise ponds and other minor beds in order to promote the biotic communities which occur there. The measures are planned as a long-term operation and will only be certain of success if supported by contract-based nature conservation arrangements. Cooperation with other land-uses (fisheries, hunting, agriculture, road building) is essential.

[Contribution by the Brandenburg Ministry for the Environment, Nature Conservation and Regional Planning]

Peregrine falcons

Reintroduction of tree-nesting peregrine falcons in Brandenburg

For many centuries, peregrine falcons have played a major role as hunting birds in European civilisations. In many areas they have experienced a sharp decline, especially in recent decades. By carefully introducing peregrines bred in captivity into the wild, it is hoped that tree-nesting peregrines will again become established in the North German Plain, where they had become extinct. The project was based on public nature conservation agencies and private initiatives working successfully together. For the project to succeed, it is also very important that there is effective cooperation with forest managers and the hunting community.

[Contribution by the Brandenburg Ministry for the Environment, Nature Conservation and Regional Planning]

Arable weeds, here: poppies

Species protection measures for arable weeds in Lower Saxony

In order to conserve species of arable weed that are either threatened with extinction or otherwise endangered, the *Land* government of Lower Saxony provides funding for species protection measures carried out on extensively farmed arable land.

Farmers enter into a voluntary commitment to manage field margins 3 to 6 metres wide or expanses of field without the use of organic or mineral fertilisers, lime, sewage sludge, faeces or plant protection agents. Under the scheme cereals (except maize) and winter rape may be grown without undersowing and at standard sowing concentrations or lower. Where problems with "weeds" occur, mechanical crop care is permitted. However, the farmers are not allowed to store farmyard manure or sewage sludge, lay down clamps or sow their own arable weeds. Supplementary conditions apply where endangered bulbous plants or late-fruiting species occur. In return, the farmers receive an annual payment of DM 1,000 per ha.

Expert support for the species protection measures is provided by Lower Saxony's agency responsible for ecological services, the *Niedersächisches Landesamt für Ökologie*. People with botanical expertise are appointed to oversee the sites. One of their responsibilities is to visit the sites and monitor efficiency. For this work, an annual allowance of DM 40 is paid for each supervised site. The findings of botanical supervision, including the extent of compliance with the land management requirements, are evaluated and published by the *Niedersächsisches Landesamt für Ökologie*.

The success and the continuation of the species protection project will largely depend on the availability of budgetary funds in future. It is hoped that the objectives of the species protection measures for arable weeds can be achieved by concluding long-term contracts (running for at least five years) with farmers. The level of financial compensation for the farmers should be higher than set-aside subsidies, otherwise problems are created by competition between the two incentive schemes.

The monitoring of effective implementation and the contact maintained with the farmers by the supervisors are both contributing factors in achieving the objectives of the species protection project. The involvement of subordinate nature conservation authorities is essential to ensure effective implementation and efficient use of funds. It can also be useful to cooperate with the agricultural authority.

[Contribution by the Lower Saxony Environment Ministry]

Berlin Species Protection Programme

As part of the Berlin Landscape Programme, the Species Protection Programme sets out a comprehensive catalogue of development goals and measures for improving conditions for wild flora and fauna in all areas of the city. Its aim is to promote an abundance of species in the city and, where uses are changing, work towards the conservation, improvement and development of the environment in which flora and fauna live. To this end, it elaborates guidelines for the development of biotopes in major urban areas (designated "biotope development areas") as well as development targets and measures for small areas of land right down to individual biotopes.

It is the city's heterogeneity that offers the potential and opportunity for developing the natural environment. The foundation for efforts to extend its species abundance is provided by the complexity of different structures alongside each other, ranging from densely-populated residential districts or intensively used sports grounds through to semi-natural green areas or expansive woodlands. This is apparent, for example, from the 170 species of birds nesting in Berlin and the approx. 1,240 species of ferns and plants, which represent 45% of all species found in the Federal Republic of Germany.

The development goals and measures of the Species Protection Programme are to be integrated into the existing and planned land uses of the growing metropolis. The programme establishes an integrated biotope system consisting of a network of large-scale species reservoirs, linear connecting biotopes running along watercourses and railway tracks, and important small-scale individual biotopes. In this way, the city authorities have created a basis for bringing successfully combining the demands of residents and visitors on their environment and the needs of plants and animals.

[Contribution by the Berlin Senate Authority for Urban Development, Environmental Protection and Technology]

Species Protection Programme of the Free and Hanseatic City of Hamburg

The Species Protection Programme is Hamburg's nature conservation programme. It sets out priorities for biotope protection. It is scientifically underpinned by comprehensive biotope mapping as well as various species mapping surveys. Biotopes and species have been comprehensively mapped and evaluated. All areas are classified within a spectrum ranging from "abiotic" to "exceptionally valuable" habitat complexes, and then consolidated into 15 biotope development zones. Each of these zones is largely homogenous in terms of biotope attributes. For each, development goals and measures are defined for the conservation and management of biotopes.

The biotope development zones primarily delineate the semi-natural areas of Hamburg and valuable agricultural sites, but also mark out those intensively used areas given over to housing, commercial uses and roads where species and biotope protection measures must also be applied.

Semi-natural habitats can only have a long-term future if they are linked up as a network. An integrated biotope system therefore plays a major role in securing and restoring habitats. An important element of the Species Protection Programme as part of the Hamburg's countryside programme is its graduated system of protected areas, consisting of Nature Conservation Areas, Landscape Reserves, Natural Monuments and the Hamburg Wadden Sea National Park.

The Species Protection Programme has binding force as far as administrative action is concerned. The quality of the outcomes will primarily depend on how effectively it is applied in planning procedures and implemented on the ground.

[Contribution by the Environmental Authority of the Free and Hanseatic City of Hamburg]

Species and Biotope Protection Programme of Thuringia

In the Land of Thuringia, the Species and Biotope Protection Programme *(Arten- und Biotopschutzprogramm;* ABSP) is being set up as a precautionary measure to safeguard wild flora and fauna. The rough concept was completed in a fast-track development process in 1993 and work on the finer details is currently in progress at district level where the targets are being more precisely defined.

In this programme, all the available information on wild animal and plant species and their habitats, in the form of ongoing and completed mapping projects and consultations with experts, will be collated, analysed and evaluated The aim is to design a Land-wide integrated biotope system and present the necessary measures for the conservation and development of these areas.

The Species and Biotope Protection Programme is to be a wide-ranging initiative. The intention is to achieve broad acceptance. It will be open not only to the nature conservation administration but also to authorities in other sectors, to organisations and other interested parties, and in particular to the local authorities. It is designed to give the local authorities greater scope to carry out measures locally to safeguard biological diversity.

[Contribution by the Thuringian Ministry of Agriculture, Nature Conservation and the Environment *(Thüringer Ministerium für Landwirtschaft, Naturschutz und Umwelt)*]

Integrated biotope network as part of Bavaria's Species and Biotope Conservation Programme

In order to establish an integrated biotope network covering the whole Land as a species and biotope protection measure, a cartographic work on the scale of 1:1,000,000 was drawn up as a technical reference. Published in Volume I of the series *"Arten- und Biotopschutzprogramm Bayern"* (ABSP), this work shows the areas, throughout Bavaria, of outstanding importance for species and biotope protection. Another important source of information for the landscape management sector is Volume I of the Landschaftspflegekonzept Bayern, which formulates Bavaria-wide concepts for landscape development based on the needs of nature conservation.

[Contribution by the Bavarian State Ministry of *Land* Development and Environmental Affairs]

5.4.2 *"Ex-situ"* conservation of species

Some endangered and rare species can only be conserved if they are also kept and propagated outside their natural habitat. However, in nearly all cases, *ex-situ* protection is no alternative in the long run to the conservation of species in their natural habitats. It plays a far smaller role for native wild species than for species which serve as genetic resources for forestry, agriculture and food (cf. Chapter 5.5). Remaining stocks of rare and endangered native species of forest tree (e.g. yew, wild service tree, true service tree, European wild apple), even though they are hardly of any economic importance to forestry, are concentrated in conservational plantations of seed trees to enable future reintroduction in woodlands and the countryside.

Yew tree

The *ex-situ* conservation of endangered native wild plants is mainly practised in the protected collections of Germany's approx. 70 botanical gardens and arboretums. Farming and village museums also contribute to the conservation of arable weeds, of ruderal species and of species once used in folk medicine or seasonal religious customs. In addition, cultivation for conservational purposes in the appropriate landscape can also contribute to the preservation of native plant species. In these cases, there is no longer a clear distinction from in-situ protection.

Cultivation of plants of the Brocken for conservational purposes

An example of cultivation for conservational purposes is the plant sanctuary on the *Zeterklippe* in the Harz mountains. The intention here is to practise cultivation for conservational purposes by growing, under similar conditions, the plant species found on the top of the Brocken, the highest summit of this low mountain range. A particular concern is to ensure the conservation and regeneration of the Brocken anemone, an endemite of this exposed and isolated region. The sanctuary is also conserving and propagating the tea-leaved willow, which has also evolved a taxon endemic to the Harz region.

[Contribution taken from the Federal Office for Nature Conservation's 1995 report, *Bundesamt für Naturschutz: Materialien zur Situation der biologischen Vielfalt in Deutschland*]

The total number of species whose survival can be partly assisted by *ex-situ* programmes remains limited due to the high costs that are often entailed. Zoological gardens have so far only played a minor role in conservational breeding of native species and reintroduction projects, since the international conservational breeding programmes involving German zoos generally focus on non-native species.

Cf. the contribution by Cologne Zoo on behalf of the *Verband Zoologischer Gärten)* in the Annex: "Noah's Ark": the role of zoological gardens in implementing the Convention on Biological Diversity

5.4.3 Legally binding measures in the European Union

The EC's nature conservation directives (Birds Directive and Habitat Directive, cf. Chapter 5.3.3) contain *inter alia* provisions on species protection. Annex IV of the Habitat Directive lists species whose protection requires that the Member States limit direct access. This regulation is supplemented by a list of animal and plant species for which the Member States may limit use wherever they deem this to be necessary.

5.4.4 Measures in line with international conventions

Some important international conventions concerned with biological diversity focus primarily on the protection of particular species.

Checkerspot, male

Bern Convention

The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) was signed in Bern in 1979 by members of the Council of Europe and has been in force in the Federal Republic of Germany since 10 April 1985. States not belonging to the Council of Europe may also accede to the Convention.

The Convention has three main objectives:

- to protect wild fauna and flora and their natural habitats, in particular species and habitats for whose conservation the cooperation of several states is required,
- to promote inter-governmental cooperation in the field of nature conservation,
- to draw attention to endangered species, including relevant migratory species.

The Bern Convention is concerned primarily with selected species that are classified as being endangered, vulnerable, rare or threatened with extinction.

Bonn Convention

The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention; CMS) has been in force in Germany since 1984. The Bonn Convention is aimed at providing protection for species which, as a result of the seasonal presence of their populations on the territory of many different states, cannot be adequately protected by individual national laws and measures.

Particoloured bat

The Bonn Convention is designed to be of global validity. Within the Convention, regional agreements serve to improve and harmonise the protection of particular species worldwide and, via species protection measures, to enhance protection for important large-scale habitats (e.g. seas, coasts, wetlands and forests). The following regional agreements are currently in force to protect animal species whose habitat range includes German territory:

- Agreement on the Conservation of Seals in the Wadden Sea,
- Agreement on the Conservation of Bats in Europe,
- Agreement on the Conservation of Small Cetaceans of the Baltic and North Sea.

The final act of an agreement on the conservation of migratory waterbirds (African-Eurasian Waterbird Agreement) was signed in June 1995 by 66 States. However, the Convention has not yet entered into force.

Convention on International Trade in Endangered Species

The EU in its totality, and Germany in particular, represents an important market for imported live flora and fauna as well as for their components and products. Controls and restrictions on imports from non-EU states under the provisions of the Convention on the International Trade in Endangered Species of Flora and Fauna (CITES), signed in Washington, provide real scope for protecting the populations of wild animals and plants in their countries of origin and thus contributing to the conservation of global biodiversity.

CITES is uniformly implemented in the Community by EC Regulation 338/97. This contains additional restrictions on the import and sale of particularly endangered species and thereby contributes to more effective enforcement of the trade restrictions stipulated under the Convention.

Apollo

Cf. the contribution by *WWF Deutschland* in the Annex: "The TRAFFIC programme for observing and reducing the illegal trade in wild animal and plant species"

5.5 Conservation of genetic variety and genetic resources

Genetic variety as an integral part of biological diversity can be conserved both *in situ* and *ex situ*. *In-situ*

conservation has the advantage of safeguarding the population-genetic and evolutionary dynamics, whereas *ex-situ* conservation attempts to conserve existing genetic variety.

Preference is given to conserving genetic variety among wild indigenous organisms *in situ* by means of measures to conserve their habitats and provide direct species protection. Genetic variety can be adulterated by the dissemination of seeds or plant material from strains taken from another area. The initiatives to conserve their genetic variety ex situ have largely been covered by the description of *ex-situ* species conservation efforts given in the previous chapter.

Measures to conserve forest genetic resources

In response to a decision taken by the *Bundesrat* in 1985, a concept for the conservation of forest genetic resources in the Federal Republic of Germany was developed in 1987. It gives priority to the *in-situ* approach to safeguarding forest genetic resources. Particular importance is attached to semi-natural silvicultural methods and natural rejuvenation. Thanks to increased accreditation of autochthonous stands (more than 60%) and good harvests, it has been possible in recent years to improve the supply of native propagation material available to German forestry. While protected areas can help to conserve forest genetic resources, in some cases the aims they serve may actually run counter to the objective of genetic conservation. In many cases it has been necessary to engage in special activities. Although conservation measures centre on the main tree species, rare tree and shrub species are increasingly being included.

Ex-situ conservation should not only take the form of storage in gene banks; rare and sporadically occurring species and strains are also to be brought together in seed orchards in order to ensure propagation and secure a broader genetic base. In particular, strains from areas and populations severely endangered by pollution are to be safeguarded by *ex-situ* planting or sowing.

Conservation of forest genetic resources at Federal and Länder level

The Federal-*Länder* Working Party "Conservation of Forest Genetic Resources" *(Bund-Länder-Arbeitsgruppe "Erhaltung forstlicher Genressourcen")* provides a forum for collaboration between the various Federal and Länder forestry research and experimentation institutes and their gene banks. Under its auspices, conservation measures were taken between 1987 and 1995 to preserve more than 110 tree species and 30 shrub species, while also serving to expand rare genetic resources to permit increased planting in woodlands and the countryside:

1. measures integrated into the framework of semi-natural silviculture
2. *in-situ* conservation measures
   - 2,377 conservational stands on 5,323 ha
   - 26,305 individual trees
3. *ex-situ* conservation measures
   - planting of 1,993 *ex-situ* stands on 2,368 ha in less polluted areas
   - 362 seed plantations on 809 ha (16,046 specimens), 105 clone archives (11,238 specimens),
   - storage in gene banks of seeds (taken from 2,163 stands and 9,183

     trees individual), pollen specimens (6,527) and *in-vitro* tissue specimens (327)

[Contribution by the Federal-*Länder* Working Party on "Conservation of Forest Genetic Resources"]

Genetic Resources in Saxony-Anhalt

In a study commissioned by the Ministry for Regional Planning, Agriculture and the Environment *(Ministerium für Raumordnung, Landwirtschaft und Umwelt)*, entitled "Concept for implementing national and international regulations and programmes for identifying, conserving and using genetic resources in the *Land* of Saxony-Anhalt", Saxony-Anhalt has defined and surveyed the *Land's* genetic resources of relevance to this aspect of biological diversity. This was followed by a description of the measures being taken to protect and develop genetic resources in Saxony-Anhalt and an overview of the provisions on the use of genetic resources in the *Land*.

[Contribution by the Ministry for Regional Planning, Agriculture and the Environment, Saxony-Anhalt]

Using shrubs and trees of native origin to conserve genetic variety in North-Rhine/Westphalia

The planting of shrubs and trees of uncertain origin can have a negative impact on the genetic structure of native populations and result in genetic degradation. That is why, when planting woody plants in the countryside, it is important to ensure not only that native tree and shrub species are used but also that the risk of genetic adulteration of flora is avoided by using approved strains appropriate to the respective natural area.

The North-Rhine/Westphalia Environment Ministry therefore issued a decree in 1994 containing directions "for planting, protecting and tending planted areas in green spaces around buildings". In the case of publicly funded planting projects for landscaping purposes, native plant material of guaranteed origin from the respective area is, in future, to be used whenever available. Whilst this material is already largely available for the major native tree species in North-Rhine/Westphalia, which are covered by the Forest Seed and Plant Resources Act, the market for shrubs and secondary tree species has yet to be developed.

[Contribution by the Ministry for the Environment, Regional Planning and Agriculture, North-Rhine/Westphalia]

Alluvial meadows on the banks of the Elbe near Pekepitz

Conservation of genetic resources in Saxony-Anhalt

The conservation of biological diversity in the alluvial meadows bordering the Elbe *(Elbaue)* is of central concern in the Mittlere Elbe Biosphere Reserve. The concept for identifying, conserving and using genetic resources in the Land of Saxony-Anhalt stipulates which biotopes and species are to be protected in the Biosphere Reserve. To ensure their preservation, the system of protected areas must be expanded to include other sites worthy of protection.

Forest genetic resources, such as the autochthonous black poplar and the common elm, are under observation in the *Mittlere Elbe* Biosphere Reserve as part of the forest genetic resources project run by the German forest conservation group *Schutzgemeinschaft Deutscher Wald.* Individual examples of the autochthonous black poplar, a species threatened with extinction in Saxony-Anhalt, were identified throughout the area and propagated using cuttings. It was possible to plant out the first saplings in the Biosphere Reserve in 1996.

In the eastern part of the Biosphere Reserve, there is a special tradition of fruit cultivation. Under one of the projects, efforts are being made to build on this tradition and develop it further using modern techniques. The surviving stocks of old fruit varieties indigenous to the Anhalt region are being identified and the trees propagated for use, among other things, in the reconstruction of orchards recorded in historical documents. Moreover, the project also aims to develop fruit processing in the region and market the products.

The efforts to conserve genetic resource encompass Protection Zone III of the Mittlere Elbe Biosphere Reserve, which is predominantly used for farming. These efforts include:

- protecting endangered species of the river meadow grasslands by means of contract-based nature conservation,
- reconciling the interests of nature conservation and farming in arable landscapes.

The Brocken, the highest mountain in the Harz range of the Central German Uplands, and a few other sites are home to a race of spruce (*Picea abies* [L.] Karsten) that is particularly well-adapted to the conditions of the Hochharz They are characterised by a slender growth form, great strength and relatively high resistance to the effects of pollution.

The first measures to safeguard this particular race began in the 1980s. Elite trees of between 200 and

300 years of age were marked and used for seed collection. Cuttings were also taken.

The Hochharz National Park is committed to conserving this autochthonous race in the Hochharz. It is estimated that there is already sufficient seed to meet spruce planting requirements over the next 50 years.

An attempt is being made close to the Brocken to underplant autochthonous spruce among lowland spruce. The individuals planted are marked, but are developing significantly more slowly than they would through natural rejuvenation.

[Contribution by the Ministry of Regional Planning, Agriculture and the Environment, Saxony-Anhalt]

Measures to conserve genetic resources in relation to crops and livestock

Ex-situ conservation has to date clearly played the central role in relation to crops not only for financial and practical reasons but also due to the easy accessibility it offers and to the availability of appropriate technology. In the case of domesticated animals, however, *ex-situ* conservation is far more demanding in terms of technology and finances, so that *in-situ* conservation takes precedence. Nevertheless, developments in biotechnology have made *ex-situ* conservation a rational option for many livestock species.

EC Regulation 1467/94 on the conservation, characterisation, collection and utilisation of genetic resources in agriculture is aimed at Community-level coordination and support for individual national measures on the basis of a five-year programme of action. The measures it provides for are designed to improve the efficiency of each country's activities. They encompass genetic resources of cultivated plants, forest plants, domesticated animals, fishes and micro-organisms.

Since 1980, the European Cooperative Programme for Genetic Resources (ECP/GR) has provided a platform for the 30 European countries participating to conduct projects within European networks concerning cereals, animal feed, potatoes, vegetables, fruit, industrial crops and neglected crop varieties as well as logistical matters such as information and documentation. Working parties have been established to coordinate national and jointly implemented measures to conserve and utilise ex-situ collections and develop common data bases.

The conservation measures are being implemented globally by means of an international division of labour. A special role is played by the Commission on Genetic Resources for Food and Agriculture (CGRFA) of the Food and Agriculture Organisation of the United Nations (FAO). The FAO's efforts over the last 30 years to create a global system of phytogenetic resources have been based on FAO Conference decisions, which are not legally binding. Germany has signed up to the agreements concluded in this framework and plays an active role on the relevant bodies. Scientific and technical information, consultation and coordination are provided at international level above all by the International Plant Genetic Resources Institute (IPGRI).

Meeting in Leipzig in June 1996, the 4th International Technical Conference of the FAO agreed upon a Global Action Plan for the Conservation and Sustainable Use of Plant Genetic Resources for Food and Agriculture. The plan contains proposals for comprehensive measures to be implemented in accordance with national priorities on the basis of national programmes. As for the conservation of animal genetic resources, the FAO is currently developing a Global Strategy on this issue.

Oil squash

***In-situ* conservation of crops**

There are a number of assistance programmes and initiatives, organised by various interest groups, that centre on increasing the diversity of crop species and va-

rieties cultivated and reviving various old production lines, especially in the field of renewable raw materials. An important role is played here by the *Fachagentur Nachwachsende Rohstoffe*, a specialist agency promoting renewable resources. The *Fördergemeinschaft Integrierter Pflanzenbau e.V.* (FIP), an association promoting integrated cultivation, has set itself *inter alia* the goal of increasing crop diversity by bringing new species, such as plants with fuel or material applications, into cultivation. Many associations, organisations and private initiatives have set themselves the goal of conserving and developing the widest possible biological diversity of crops in farming. Landscape conservation associations and local nature conservation groups are also increasingly concerned with these issues.

The Federal Ministry of Food, Agriculture and Forestry is sponsoring a model project on the management of fruit genetic resources at their natural site. The aim is their conservation and multivalent utilisation, taking account of pomological, land-conservation and landscape-ecology aspects. Having surveyed and evaluated a collection, which is unique in Europe, of probably over 1,000 varieties of old fruit trees in the Greater Berlin and the Frankfurt/Oder region, the project aims to develop a long-term conservation strategy for the trees in line with the requirements of nature conservation and landscape protection.

Farmer's garden, Hofstetten

Old vegetable varieties are conserved in domestic and allotment gardens. Moreover, varieties available from suppliers for planting in domestic gardens include old and traditional varieties and those exempt from former cultivar protection. Biosphere Reserves and agricultural history museums are planning to redouble their efforts to maintain the use of agricultural and horticultural crops in the production process. The *Informationszentrum für genetische Ressourcen* (IGR), an information centre for genetic resources, based at the central office for agricultural documentation and information, the *Zentralstelle für Agrardokumentation- und Information* (ZADI), is preparing to expand its central data base on phytogenetic resources to include data collected *in situ*.

Conservation of plant genetic resources in large-scale protected areas in Brandenburg

The development of modern production methods in farming was accompanied by a rapid depletion of the diversity of species and varieties and a far-reaching homogenisation of the plant material that remained. The work currently being carried out as part of model projects run by Brandenburg's agency for large-scale protected areas, the *Landesanstalt für Großschutzgebiete*, includes the reintroduction of suitable old crops into these areas. This is possible mainly thanks to cooperation with Germany's largest gene bank at the *Institut für Pflanzenzüchtung und Kulturpflanzenforschung* (IPK), the institute for plant genetics and crop science in Gatersleben.

Large quantities of appropriate seed material are supplied to small farmers interested in the initiative. More than 300 different species and varieties taken from the stocks at the gene bank are currently being cultivated, including some 80 cereal varieties. The difficulties encountered by the initiative are partly due to the legal restrictions imposed under current seed and variety legislation. A further difficulty is that not always possible to convince the bodies administering agriculture to make reintroduction targets an objective of farm support programmes.

[Contribution by the Brandenburg Ministry for the Environment, Nature Conservation and Regional Planning]

Cf. the contribution by the Bundesverband deutscher Pflanzenzüchter e.V. in the Annex: "German breeding associations' contribution to the conservation of phytogenetic resources"

In-situ conservation of domesticated animals

The current conservation measures for farm animals receive considerable funding from the Länder in the form of rearing and breeding grants. The rearing grant is partly co-financed from funds available under EC Regulation 2078/92. The European Commission keeps a list of those breeds of horses, cattle, sheep and goats that are regarded as being threatened with extinction and which may be promoted by awarding farmers an appropriate rearing grant under the terms of this Regulation.

Shepherd near Neuruppin, Brandenburg

The *Gesellschaft zur Erhaltung alter und gefährdeter Haustierrassen e.V.* (GEH), a society for the conservation of old and endangered livestock breeds, makes a considerable contribution in the non-governmental sphere by providing voluntary stewards for endangered breeds, coordinating private conservation measures, holding meetings, taking public relations initiatives and publishing a journal. The German society for thremmatology, the *Deutsche Gesellschaft für Züchtungskunde e.V.* (DGfZ), has long been involved in the formulation of conservation principles, recommendations and opinions on concrete conservation measures through the work of its expert committee on the conservation of genetic diversity among farm animals.

Within the Society's broad-based strategy, importance is also attached to the domesticated animals in zoological gardens, farm animal sanctuaries or agricultural museums, especially in terms of their cultural and educational value.

Ex-situ conservation of micro-organisms

Many micro-organisms cannot as yet be cultivated in isolation and under controlled conditions. However, due to the growing significance of biotechnological techniques involving the use of micro-organisms, interest in an *ex-situ* approach is rapidly growing. More than 9,000 strains of micro-organisms, plant viruses and plant, animal and human cell lines are kept at the *Deutsche Sammlung von Mikroorganismen und Zellkulturen (DSM)*, Germany's central national collection of micro-organisms. As a service facility for the research conducted in the framework of the *Wissenschaftsgemeinschaft Wilhelm-Gottfried-Leibnitz*, the DSM receives 50% of its funding from the Federal Ministry of Education, Science, Research and Technology and 50% from the *Länder*. There are also numerous other collections at other institutions working in a wide variety of disciplines.

Ex-situ conservation of crops

In Germany, there are some extensive collections of crop plants, which are made available for research, breeding, training and international exchange. Most of these collections, and especially the plant gene banks, are public institutions. A very large number of wild, primitive and cultivated forms of crop plants had already been collected and stored in the past. In recent years the gene banks have, thanks to public appeals, managed to bring together in Germany old varieties and local varieties of fruit and vegetables as well as old vegetable species from allotment gardeners.

The gene bank at the Institute for Plant Genetics and Crop Science *(Institut für Pflanzengenetik und Kulturpflanzenforschung;* IPK) in Gatersleben now contains a total of some 103,000 specimens of about 1,800 species from over 70 plant families. The gene bank at the Federal Institute for Crop Breeding Research *(Bundesanstalt für Züchtungsforschung an Kulturpflanzen;* BAZ) in Braunschweig currently contains about 57,000 specimens of 948 species from 58 plant families.

Various working and specialist collections of different crop varieties are also held by a whole number of other governmental institutions at Federal and *Länder* level, by universities, private research and breeding companies as well as certain associations and societies. Some of these collections are highly specialised. Germany has about 70 botanical gardens, some of which are also concerned with conserving and researching crop species.

View of the Siebengebirge from Ungarten

***Ex-situ* conservation of livestock**

Gene reserves can also be established in the form of gamete and/or embryo banks. This can be particularly useful as a measure to complement the maintenance of living populations. The technique of deep-freezing sperm can be employed for all farm animals, although in practice it is used only for high-yield breeds.

Cryopreservation of oocytes is still at the research stage and does not yet have any practical applications. On the other hand, deep-freezing of embryos is already possible for all domesticated animals except pigs. The sperm and/or embryo banks that already exist are located at research establishments or insemination centres, and some benefit from public funding.

5.6 Conservation of biological diversity through sustainable use

In addition to taking measures to conserve biological diversity, it is also vital to consider the ways in which this diversity is used by human beings. Since most of the natural habitats that exist in Germany will, for the foreseeable future, be subject to all sorts of economic and social uses, and since, even in the case of endangered species, the bulk of populations tend to live outside protected areas, the conservation of a large proportion of biological diversity will depend on how we regulate these forms of use.

5.6.1 Agriculture

About 55% of Germany's total area is given over to agriculture. The agriculture sector therefore assumes a particular importance and responsibility for conserving and developing the natural environment as an ecological buffer, as a habitat for plants and animals, and as a space for human recreation and leisure.

Developments in technology, rising labour costs and, not least, growing competitive pressures, have meant that:

- agricultural production processes have become increasingly mechanised,
- extensive use was made in the past of plant protection agents and fertilisers, and
- in animal rearing, there has been greater concentration in terms of stocking density.

All these trends have brought about increased degradation of nature and the environment.

In recent decades, environmental legislation for the agricultural sector has therefore been formulated to encompass *inter alia* measures relating to plant protection, nature conservation, protection of waters, building law and waste management law. Special incentive programmes to promote the implementation of nature conservation measures in the form of stewardship and development are making a valuable contribution to the establishment of more sustainable forms of land use. Changes in the market, brought about by the reform of the EU's Common Agricultural Policy, have also meant that farming has recently become less intensive in a number of important areas. Generally speaking, the last few years have seen a significant decline in the impacts of agriculture on the environment.

In May 1992, the decision to reform the Common Agricultural Policy brought about a fundamental change of direction in EC agricultural policy. In addition to changes in the sphere of market regulation that will generally help to reduce the intensity of farming in important sectors of agriculture, the decisions on the reform of the Common Agricultural Policy contain supporting measures serving in particular the interests of environmental protection and nature conservation. The Regulation on agricultural production methods compatible with the requirements of the protection of the environment and the maintenance of the countryside (EEC 2078/92) is particularly important. This Regulation obliges the Member States of the European Union to offer farmers incentives to adopt environmentally sound farming methods that will protect natural habitats. For instance, farmers may qualify for special grants for substantially reducing their use of fertilisers and plant protection agents, using organic methods of cultivation, practising special forms of ex-

Fallow land with corn Chrysanthemum

tensive crop production, reducing the proportion of cattle and sheep per forage area, setting aside arable land for environmental protection and nature conservation purposes, taking steps to conserve threatened species, varieties and breeds of crops and livestock, and participating in certain other environmental programmes.

EEC Regulation 2078/92 is being implemented in Germany at two levels. On the one hand, all the Länder have drawn up their own agri-environmental programmes (25 to date), which offer farmers grants for a range of extensification, environmental protection and nature conservation measures. On the other hand, the scheme operated under the Joint Federal-*Länder* Task of Improving Agricultural Structures and Coastal Protection has been extended to embrace "market and site-appropriate land management" as a funding criterion.

Thus, it is now possible under the arrangements of the Joint Federal-*Länder* Task to award grants for low-intensity production methods of arable farming or permanent cropping, for extensive use of grasslands and for organic cultivation methods. In 1994, these programmes helped promote particularly extensive land management methods on 1.7 million ha (or around 10% of the total area used for agriculture).

The programmes at Federal and *Länder* level that are based on EEC Regulation 2078/92 contribute to the protection and sustainable use of natural resources in a country whose landscape is shaped by agriculture and forestry. In 1996, assistance was provided under these programmes for particularly extensive land management methods practised on approx. 5.2 million ha (or around 30% of the total area used for agriculture). Most of these grants took the form of "basic assistance for the conservation of the countryside" and impose comparatively less stringent environmental standards (approx. 2.7 million ha in 1995/96). Measures which can be expected to produce more significant environmental benefits are being carried out on 2.5 million ha. About 160,000 ha of this area are covered by grants for organic farming. The Community contributes 50% of the funds for agri-environmental programmes. In economically weak regions, like those in the new (eastern) Länder, co-financing amount to 75%.

Total support for organic farming comes to around DM 130 million, covering about 354,000 ha. Alongside the other environmentally sound production methods, organic farming makes an important contribution to the sustainable use of biological diversity in agriculture.

In relation to structural funding for agriculture under the arrangements of the Joint Federal-*Länder* Task of Improving Agricultural Structures and Coastal Protection, increasing importance is also being attached to environmental and landscape management concerns in the formulation of other funding criteria (e.g. land consolidation and voluntary land swapping).

Cf. the contribution by the *Arbeitsgemeinschaft Ökologischer Landbau e.V.* in the Annex: "Organic farming"

and the contribution by the *Deutscher Verband für Landschaftspflege e.V.* in the Annex: "Cooperation models for integrating land users into nature conservation for the marketing of regional products"

5.6.2 Forestry

In the Federal Forest Act and the forest legislation of the *Länder,* the functions performed by the forests in terms of use, protection and recreation are accorded equal priority. It is stipulated that these functions are to be safeguarded by means of proper forest management. One element in this set of objectives is the need to maintain the efficiency of the ecosystem, which includes safeguarding biological diversity. The "proper management" stipulated in the Federal Forest Act is not defined in any more detail. However, the Federal Minister of Agriculture and the agricultural ministers of the Länder agreed in 1989 on a definition of proper forestry management that takes into account *inter alia* the conservation of biological diversity. This latter criterion is met by such measures as:

- preserving forest ecosystems as habitats for species-rich biota by endeavouring to establish healthy, stable and varied woodlands;
- choosing site-appropriate tree-species;

- using suitable seed and plant material for the conservation of genetic variety.

The Federal Government and the *Länder* design their forest policies in accordance with the principles of ecological silviculture, which take particular account of biological diversity. In recent years, the *Länder* forest authorities have drawn up binding rules for the management of almost all areas of publicly owned forest in Germany that require semi-natural multi-purpose forests capable of performing all the forest functions. The objectives pursued by this form of forest management include:

- stability of woodlands through the ability of the biotic communities of flora and fauna to adapt to changing environmental influences and through the ability of stands to resist damage;
- selecting tree species as closely as possible to the species that would naturally occur;
- mixed and age-graduated tree populations (structural variety);

Vegetation in clearings

- priority for natural rejuvenation in new forest growth;
- forest management to control the natural selection processes, mixed growth regulation and quality timber production;
- working methods and forestry techniques that have a low impact on ecosystems and stands;
- respect for nature conservation and landscape management concerns, for instance by preserving and promoting rare or special forms of vegetation and species of tree and by not removing lying and standing dead wood;
- appropriate game stocks;
- integrated forest protection, which primarily means a proactive approach to protecting forest stands from harmful influences. Above all, this requires measures to deprive bark beetles of breeding sites and the setting of traps containing attractants. Chemical plant protection agents are only to be applied in exceptional circumstances where the existence of whole forest stands is threatened and unacceptable ecological damage is likely to ensue;

Alluvial forest of Bacherlen

- permanent afforestation, which means avoiding/refraining from clear cutting wherever possible and desirable and, instead, only harvesting trees individually or in groups.

In their endeavours to implement these silvicultural objectives in state forests, the Federal Government and the *Länder* are engaged in an ongoing exchange of ideas through various specialist bodies. Since the *Länder* are in charge of forestry and are the main owners, implementation is a matter for *Länder* forest authorities (only 4% of forest cover belong to the Federal Government).

For private and institutional forests, too, forestry assistance schemes have long been geared to the model of

semi-natural forestry. Thus, measures to convert to semi-natural forestry and to introduce site-appropriate young stands can qualify for government grants provided from the funds available under the Federal-Länder Joint Task Improving Agricultural Structures and Coastal Protection. In recent years, an annual total of between DM 35 and 40 million has been allocated in grants from Federal and *Länder* funds. Where open land is afforested for the first time, up to 85% of costs for which subsidies are available may be paid in the form of an investment grant for growing locally appropriate broad-leaved trees, as compared to the maximum 50% grant for growing coniferous stands. In addition to sowing and planting, measures to ensure controlled succession have also qualified for grants in recent years. The recommendations of the *Länder* authorities concerning the strains to be planted are binding under most assistance schemes, thus guaranteeing the use of site-appropriate and genetically varied propagation material. The approval procedure requires that the conservation of special biotopes, such as extensively used grasslands, is taken into account when planning afforestation measures.

These efforts are supplemented by special measures to conserve forest genetic resources. This new policy direction for forestry promotion enhances a trend that many private and institutional forest owners have already been following for many years.

The transformation of forest stands towards ecological and site-appropriate silviculture is obviously a long-term undertaking, given the long life-cycle of forest trees and the associated long-term nature of forestry production.

Although sustainable semi-natural forestry may be expected to make a major contribution to the conservation of biological diversity, some questions still require closer examination. For instance, we still know too little about the effects of certain forestry practices on the biological diversity of forests and on the genetic variety of our forest tree species. These topics are therefore the subject of research (cf. Chap. 5.8.2).

Old, traditional forms of forest use, such as in pasture, coppice and composite forests, have a special significance in relation to the conservation of biological diversity. That is why numerous countries are already making efforts to preserve, at least partially, these old forest uses. To this end, steps should be taken to re-establish feasible ways of utilising timber from coppice and composite forests. The use of this wood as fuel in chip stoves has, for instance, already proved successful.

Forest biotope conservation programme in North-Rhine/Westphalia

In North-Rhine/Westphalia, the major areas of deciduous forest in which site-appropriate forest communities still prevail are surveyed and mapped under the Forest Biotope Conservation Programme. In order to conserve and enhance both the extensive complexes of characteristic deciduous forest and the minor woodland areas that are often closely interlinked with other biotope types, the *Land* has decided to safeguard valuable indigenous biotic forest communities and woodland areas of special importance with regard to biotope and species protection by awarding them the status of Nature Conservation Areas or natural woodland patches, unless they already receive adequate protection as biotopes under Article 62 of the *Land* Nature Conservation Act.

In the medium term, a total of some 80,000 ha of forest (i.e. 3.2 % of the *Land's* total area or 9% of its forest cover) is to be secured in this way under the Forest Biotope Conservation Programme. Of this area, 32,000 ha is state forest. The conservation and optimisation of broad-leaved deciduous forests is achieved by semi-natural forestry practices and takes place in the framework of contract-based nature conservation arrangements. Thus, in 1994 contractual agreements on nature conservation in woodlands were concluded with the forest owners' associations in North-Rhine/Westphalia. As a result, arrangements have been reached which allow diverse interests to be reconciled when implementing nature conservation goals on sites covered by the Forest Biotope Conservation Programme. In practice this means:

- the status quo shall prevail in Nature Conservation Areas ;
- Within Nature Conservation Areas it is prohibited to convert deciduous forest into coniferous forest;
- technically necessary supplementary restrictions on silvicultural use shall apply only to certain measures which are actually carried out during the period in which a regulation applies.

Compensation was agreed for loss of yield and other economic disadvantages arising from compliance with nature conservation requirements for the priority areas of forest under the Forest Biotope Conservation Programme.

[Contribution by the North-Rhine/Westphalia Ministry of the Environment, Regional Planning and Agriculture]

Old bed of the river Danube

The Berlin city woodland management concept

In Berlin, as in any large city, the pressures on woodlands have grown enormously. There has been a functional shift from the forest as a source of wood to the forest as a local amenity for recreation, an oasis of nature conservation, a reserve for drinking water, a lung for cleaning polluted air, a screen for smothering noise, and a factor restoring equilibrium to the micro-climate of the city. These functions have equal priority and must be permanently and cost-effectively secured.

In the context of tackling the urgent task of merging the then separate forest authorities of East and West Berlin into a single administrative body, a set of silviculture guidelines was drawn up in 1991 with the title "A New Approach to Forests", which represents a forest policy programme charting the way forward.

The forest is envisioned as an alternative realm to the everyday environment in which people live, i.e. it forms a contrast to the living room or the municipal park. For it is structurally irregular, being interspersed by glades and water, and containing dead wood and, ideally, a great variety of trees, bushes and shrubs. In terms of silviculture, the primary aim is to create and maintain a mixed forest in the form of permanent woodlands containing native plant species. The very aim of Berlin's forest managers is to proceed with a certain lack of purpose; in other words, they want to get away from the rigid notions attached to certain forms of silviculture. Silviculture is understood as a long-term exercise in "promoting self-help", i.e. helping to strengthen the vitality of trees. The vitalisation of forest ecosystems and the soil is the central imperative.

[Contribution by the Berlin Senate Authority for Urban Development, Environmental Protection and Technology]

Natural forestry as practised in Hesse

Hesse's forests are still a relatively unspoilt ecosystem, with special importance for nature conservation and landscape management. The central objectives of nature conservation and landscape management can be integrated into forest uses without causing too many conflicts of interest. That is why the forest has great potential as a large area that can provide an ecological buffer and space for rejuvenation. The introduction of "natural forestry" laid the crucial foundation for securing these functions. In Hesse, this form of forest management is obligatory in state forests and always strongly recommended in local authority and private woodlands.

"Natural forestry" comprises the following measures:

- reducing the intensity of forestry on low-yield sites;
- providing species and biotope protection (for instance, by raising the proportion of old growth and dead wood, renaturalising special sites);
- allowing the natural cycle of woodlands processes to run its course (process protection);

- designating priority areas, e.g. valuable biotopes forming part of an integrated biotope system,
- keeping large contiguous forest areas free of developments that would fragment the landscape;
- implementing biotope mapping surveys;
- combating the input of air-borne pollutants that damage woodlands;
- expanding woodland cover in sparsely wooded, intensively farmed areas;
- ecological management of forest succession in all areas where agricultural production has ceased;
- planting new alluvial woods on the flood plains of streams and rivers.

[Contribution by the Hesse Ministry of the Interior and for Agriculture, Forests and Nature Conservation]

Cf. the contribution by the *Arbeitsgemeinschaft Deutscher Waldbesitzerverbände e.V.* in the Annex

and the contribution by the *Deutscher Forstwirtschaftsrat* in the Annex: "Wood from sustainable forestry": eco-labelling by the *Deutscher Forstwirtschaftsrat.*

Labelling of wood

Concerned about the ongoing losses of the world's forest cover, especially in tropical regions, various organisations are active at an international level in developing certification systems for forestry.

In the summer of 1996 the German forestry industry presented its own sustainability label to the public bearing the words "Wood from sustainable forestry. Grown in Germany's forests". In the context of:

- an established body of national forest legislation that has proved itself capable of guaranteeing sustainable and proper forest management,
- the difficult economic situation facing forestry enterprises, and
- the high proportion of small-scale forest owners in Germany,

the high costs entailed makes a system of certification based on individual enterprises unfeasible. Moreover, the industry also sees the potential danger of distorting competition as a result of different certification standards in different countries.

The Federal Government takes the view that certification and labelling should be organised on a voluntary basis. It regards certification as a useful instrument of international forest policy for promoting sustainable forest management in the sphere of the tropics and of the boreal forests. It is now understood that sustainability encompasses the permanent safeguarding of all forest functions. In Germany, this protection is required by law and is provided at an internationally high standard.

Cf. the contribution by the *Bund für Umweltschutz e. V.* (BUND)) in the Annex: "?"

5.6.3 Hunting

The necessary framework for sustainable management of game stocks is created by the provisions of the Federal Hunting Act and the *Länder* hunting laws together with the practice of complying with hunting grounds and the system of long-term hunting leases.

The legally stipulated dates for the hunting season and bans on certain practices provide a framework for hunting that accords with the requirements of nature conservation and animal welfare. However, regional conflicts may still arise with regard to the objective of conserving biological diversity (such as possible habitat changes caused by the stocking of large numbers of game). This is why it is important to foster close cooperation, especially between the representatives of nature conservation, hunting, forestry and agricultural authorities in the localities concerned.

The hunting associations make a contribution through their work to the conservation and sustainable use of biological diversity. They are recognised by the Federal Government and almost all the *Länder* as nature conservation associations under the terms of Article 29 of the Federal Nature Conservation Act. The valuable work of the hunting community in promoting the natural environment, which is mainly carried out in cooperation with nature conservation organisations, includes biotope management measures and the acquisition of sites.

Cf. the contribution by the *Deutscher Jagdschutz-Verband e.V.*: " Nature and species protection projects run by German hunting organisations

5.6.4 Fisheries

The laws governing fishing are principally concerned with the protection, conservation and further development of fish stocks, including cyclostomata, crustaceans and mussels, and of their use through fishing. The fishing regulations are implemented with regard to both professional and amateur fishers, whereby sport fishing has become a matter of considerable importance in recent years.

The legal instruments available for conserving the biological diversity of the inland aquatic environment include fishing-related species protection in the form of fishing bans, the enforcement of close seasons, the establishment of protected zones, minimum sizes for individual fish species and regulations governing aspects of fishing tackle and methods. Those accorded the legal right to fish have a duty to conserve, expand and foster a species-rich native fish population in keeping with the size and characteristics of the lake or river system. Where the natural capacity of a water system does not allow for sufficient reproduction of fish, restocking measures are taken. However, restocking of inland water systems by the release of non-indigenous fish species or species untypical for a particular aquatic environment requires approval from the fishing authorities. For, if carried out inappropriately, measures of this kind may impact unfavourably on the biological diversity of local waters.

Moreover, the introduction of different strains in regions where they have not hitherto occurred is detrimental to the process of inner-species differentiation. This applies both to the populations of a species as well as to other taxa and units. The main obstacles to the conservation and enhancement of species diversity in inland water systems continue to be those of the intrusive building measures and wastewater discharges, although remarkable progress has been achieved here in recent years.

Landscape of ponds

Contract-based nature conservation arrangements for pond landscapes in the Free State of Saxony

In the period between 1992 and 1996, DM 11.9 million of *Land* funds was spent on contract-based nature conservation measures in the Free State of Saxony. Of this sum, DM 10.6 million alone was allocated to measures for the conservational management of fish ponds. Thanks to their semi-natural structures, Saxony's pond landscapes are the habitat of many nationally endangered plant and animal species. Contract-based nature conservation arrangements have helped to achieve for all areas a management regime that serves the objectives of biotope and species protection. Moreover, it has been possible to improve attitudes among fishing operators enterprises with regard to the conservation of fish-eating animal species such as the otter.

In future even greater use will be made of the instrument of contract-based nature conservation, especially for the management of sites under agricultural use. This means that, in addition to the programmes already being funded by the Land, special arrangements are also to be made available to farmers as part of the assistance programme for "environmentally sound agriculture".

[Contribution by the Saxony State Ministry for the Environment and Land Development *(Sächsisches Staatsministerium für Umwelt und Landesentwicklung)*]

As for fishing at sea, German fisheries can be divided into two different branches: "small-scale deep-sea and inshore fisheries" (characterised by relatively small-scale commercial operations active in the North Sea and Baltic Sea as well as in waters to the west of Britain, and "large-scale deep-sea fisheries". With a total annual catch of approx. 250,000 tonnes (1996), the German sea fishing industry accounts for a very small share of the total global catch from ocean fishing. In the waters of the EU States, sea fishing is essentially governed by the Common Fisheries Policy of the European Union. Fish stocks are managed primarily by setting limits on the size of total catches and then fixing quotas for the Member States as well as by implementing technical conservation measures designed above all to avoid damaging the marine environment and prevent the unwanted collateral catch of young fish and other marine organisms (discards).

The situation is critical for some major fish populations. This applies in particular to the cod population of the north-east Atlantic and the North Sea and to stocks of haddock and coalfish in the North Sea. Plaice and herring stocks in the North Sea have been seriously depleted, so that the limits on total catch had to be considerably lowered in 1996. The herring and sprat stocks in the Baltic Sea are, however, in good condition. Yet concern continues about the state of the cod population in the Baltic, which at present consists virtually of just one generation.

It is apparent that the fishing industry, especially in the North Sea, is not acting in accordance with the principles of sustainability, despite the strict regulations that govern the management of fish stocks. In April 1996, the EU Fisheries Council passed a Regulation (in force since 1 January 1997) to control total catch volumes and the quotas due to the Member States on a long-term basis. The main objectives of the Regulation are:

- to improve the selectivity of nets,
- to reduce the volume of discards and the scale of illegal fishing by means of a more liberal system for calculating target species and discards, and
- to harmonise and simplify the rules for all regions of the EU seas.

A the end of 1996 the Fisheries Council adopted new technical measures for conserving fish stocks. Given the persistent depletion of stocks, the European Commission and the Member States agreed not only on the need to lower the total catch volumes and quotas and reduce fleet sizes, but also that the technical conservation measures had to be harmonised and, where necessary, tightened up.

5.6.5 Water management / Flood control

Lakes, rivers and streams and their water meadows are a characteristic and crucial feature of the landscape. The systems of riparian meadows and flood plains are now exceptionally important as habitats for rare animal and plant species and as corridors linking the network of semi-natural biotope structures. Yet rivers and water meadows must also serve a number of very different uses and functions, including flood control, drinking water supply, agriculture and forestry, transport and recreation. A semi-natural river with wide flood meadows provides far more protection against flood damage and offers habitat for more typically riparian flora and fauna than a canalised river with water meadows that have been built over.

Canalized Ammer, Bavaria

North-Rhine/Westphalia Water Meadows Programme

Flowing waters and their water meadows are important corridors in the network of biotopes. The North-Rhine/Westphalia Water Meadows Programme *(Gewässerauen-programm Nordrhein-Westfalen)* is designed to conserve or reactivate and ecologically restore water courses, where possible from their source to their final confluence. This requires extensification of grassland sites and the conversion of riparian arable land into extensively used grasslands, which entails the same work as that performed under the Marshland Programme. The Water Meadows Programme mainly covers the rivers Lippe, Ems, Ruhr, Sieg, Agger, Issel, Niers, Nette, Schwalm, Pleistal, Swist and Rur, with a total planning area of about 80,000 ha. Land is being acquired to preserve old river branches and old aquatic sites. Land purchase is also enabling flood protection dikes to be relocated further away from a river, so that it can again run freely. The Water Meadows Programme will be implemented in stages and has an overall time frame of 20 to 30 years.

[Contribution by the North Rhine-Westphalia Ministry for the Environment, Regional Planning and Agriculture]

Conservation and use of biological diversity in riparian landscapes as seen with the *Mittlere Mulde* in the Free State of Saxony

In the Free State of Saxony, the *Mittlere Mulde* area, i.e. the middle valley section of the Mulde river, was chosen as the site of a priority project of the *Land*, since it still displays riparian meadow elements in all their stages of development. As part of the project, a fluvial aquatic ecosystem is to be protected, managed and developed on a sustainable and permanent basis. The aim is to maintain the natural dynamics of the river and thus safeguard the largely undisturbed water meadows as a flood plain and retention area. To achieve this, the following measures in particular are planned:

- development of a system of protected areas,
- management and development of the landscape and special structures,
- ensuring careful use,
- land purchase.

In this context, particular importance is attached to ensuring permanent care in the use of sites, bearing in mind that large sections of riparian land owe their present appearance to agricultural uses. In implementing the planned measures, the competent authority in the Free State of Saxony, the Ministry for the Environment and *Land* Development, will be working very closely together with the individual sectoral authorities, local authorities and users.

[Contribution by the Saxony State Ministry for the Environment and *Land* Development]

The current version of the Federal Water Act contains basic provisions on the conservation of the aquatic environment as a component of the ecosystem and of biological diversity. The safeguarding of the aquatic environment as a habitat for flora and fauna has been expressly included as a clear obligation. Waters are also to be managed in such a way as to eliminate any avoidable impairment of their ecological functions. This principle shall be taken into consideration in all plans affecting the aquatic environment.

The renaturation of waterbodies is regulated in more detail. Accordingly, waterbodies in a natural or semi-natural state are generally to be maintained in this condition and natural waterbodies that have been subjected to non-natural development are to be restored as far as possible to a natural state. The aim here is above all to ensure that natural retention areas are available to absorb floodwater. Developments on rivers and lakes must not increase the risk of flooding, especially by destroying natural retention areas in riparian forests in particular. The regulations on the renaturation of waters also serve to fulfil the Conservation's provisions on the conservation and use of biological diversity.

Some *Länder* have made use of the option of allowing the unlicensed discharge of rainwater into the groundwater for non-harmful seepage in order to contribute to flood prevention, facilitate groundwater replenishment (also in the interest of conserving biological diversity) and to reduce the financial burdens on local authorities and the public.

To guarantee the sustainable use of waters as required under the Convention, the Federal Water Act and the statutory regulations pursuant to the Act contain a number of requirements concerning above all:

- the discharge of waste water,
- installations for treating substances hazardous to water,
- pollution control of surface waters and groundwater.

Drinking water

These requirements have generally proved adequate to the task of protecting the aquatic environment.

5.6.6 Soil protection and use

Soil must be understood as a finite resource. Among its other functions, soil is essential as the habitat and basis of life for both humankind and flora and fauna, as the

basis of production in agriculture and forestry, and as the source of raw materials extraction.

The Federal Soil Conservation Act *(Bundesbodenschutzgesetz)* is to establish the prerequisites for effective soil protection. The uniform standards that the Act will set for the whole country will enable the relevant authorities to operate effectively. The bill for this Federal Soil Conservation Act is designed to maintain or restore the soil's ability to perform its functions; its role as a basis of life and as a habitat for animals, plants and soil organisms is expressly mentioned as one such function. To this end, the Act prescribes obligations to protect against and eliminate hazards to the soil, to remediate soil pollution sources and contaminated sites and to take precautionary action against future detrimental impacts on the soil. These basic obligations shall guarantee that anthropogenic chemical and physical impacts do not permanently impair the soil's ability to function properly. This means that the soil, as the habitat of soil organisms, will in future not only be indirectly protected but also given special direct protection by a Federal Law - similar to that afforded to waterbodies as the habitat of aquatic organisms. This also provides better conditions for the *in-situ* conservation of the biological diversity of soil organisms.

5.6.7 Transport

In an economy based on the division of labour, such as exists in a highly industrialised country like Germany, people develop a high level of mobility and the transport infrastructure therefore takes on a special importance. However, the transport infrastructure also exerts a whole number of negative influences on biological diversity, both direct (for instance, land depletion and land fragmentation due to the construction of traffic routes) and indirect (for instance, the emission of pollutants and noise).

In an effort to reduce these burdens further, the Federal Government is endeavouring to reduce significantly the traffic volumes and traffic-induced strains on nature and the environment by introducing a package of wide-ranging measures as part of a comprehensive integrated transport strategy, i.e. embracing all modes of transport. In doing as much as possible to prevent the degradation of nature and the environment, the Federal Government will ensure that its infrastructure planning is guided by the following principles:

- taking greater account of the needs of the ecosystem when formulating planning guidelines for traffic routes,

Construction of the B 42 Motorway, Kuckstein, Siebengebirge

- giving preference to the up-grading of existing traffic routes over the building of new ones (at the level of transport demand planning / Federal traffic routes planning),
- prioritising low-impact transport systems,
- keeping priority nature protection sites free of traffic routes
- safeguarding unfragmented stretches of countryside.

The *Länder* will adopt a similar approach in those transport policy areas that fall within their remit.

5.6.8 Urban and settlement development

The global challenge of sustainable development, which was addressed by the 1992 UN Conference on Environment and Development in Rio and is set out in Agenda 21, has consequences for settlement policy at national, regional and local level. The trends underlying the quantitative and qualitative pressures on land must be reversed. In the early 1990s more than 70 hectares per day of non-built-up land were being claimed for settlement and transport purposes in the territory of the former West Germany.

The principle of sustainable urban development as formulated in July 1996 at the Second UN Conference on Human Settlements (HABITAT II) in Istanbul must be applied to urban development in Germany. Towns and cities must offer people a healthy environment based on solid economic and social foundations and contribute to the conservation of natural resources and ecosystems.

Industrial area near Cologne

In moving towards the sustainable development of cities, urban development tasks must be tackled on the basis of:

- a prudent land policy,
- a mobility policy to create sustainable cities,
- a precautionary urban environmental policy.

The Federal Government has already adopted a varied policy agenda for sustainable urban development. As part of national preparations for the UN HABITAT II Conference, the guiding concept of sustainable urban development was introduced into a broadly-based process of participation involving all socially relevant groups. Several documents drawn up in this context have met with great interest. The "German National Report on Settlement Development and Settlement Policy", "National Action Plan on Sustainable Settlement Development" and the "Good Examples" competition are being fully supported by municipal, local and district authorities.

In the summer of the year 2000 the international conference URBAN 21 will be held in Berlin as a joint initiative from Brazil, Germany, Singapore and South Africa for sustainable development. The aim of the conference is to direct the international discussion on sustainable development, started at the 1992 Rio conference with Agenda 21, towards the specific issues of sustainable urban development in conurbations.

5.6.9 Military use

The Federal Armed Forces, the *Bundeswehr*, use approx. 1% of the area of Germany for training and exercise purposes. The *Bundeswehr* training areas are of great importance to the conservation of biological diversity for a number of different reasons. These include their size (up to 28,000 hectares), their representative nature (distributed across the whole country), their relatively undisturbed stretches of open countryside and forest, the lack of intensive farming, relatively little sealing of soil through infrastructure development, the frequent exclusion of the public for security reasons, and the necessity of looking after the properties for the Armed Forces. Due to their military use and a land management policy geared to the needs of both the military and nature conservation, these sites often display large populations of wild animals and plants and a broad range of now rare biotopes.

The Wahn Heath, "Oak Grove"

In order to achieve sustainable and environmentally sound use of military properties, the *Bundeswehr* established the required internal planning instruments a good few years ago. These serve as a basis for further action (use and management) by specifying above all the scientific parameters (e.g. natural history, geology, hydrology) of sustainability. In further stages of the planning process, these parameters are analysed with a view to achieving the goals of soil, water, biotope and species protection. It is then possible to identify, where necessary, areas that are sensitive with regard to these protection goals and propose restrictions on use.

Where discrepancies arise between the military use and the restrictions needed to comply with protection goals, the planners are obliged to examine alternative uses and weigh up the best course of action. The intended military use has priority if no alternative exists and no legislation stands in the way.

There are arrangements for an exchange of information with the *Länder* authorities. They are also given an opportunity to put forward their ideas on the management of properties. In this way it is possible to ensure that, where the military requirements permit, consid-

eration is given to aspects of water, biotope and species protection so as to foster integrated biotope networks reaching beyond the boundaries of the military property.

5.6.10 Leisure activities and tourism

In cooperation with the associations representing the tourist industry, sports and nature conservation, the Federal Environment Ministry fosters the development of models, concepts and measures to reconcile the imperatives of conserving biological diversity with the interests of leisure, tourism and recreation. The development of a sustainable tourism sector that is both ecologically and socially sound and of a sports sector that does not damage the natural environment is served by the following activities in particular:

- staging of a nationwide nature conservation competition entitled *"Natur 21"*, in which prizes are awarded for exemplary solutions to the problem of how to use land in a nature-friendly way, i.e. for tourism and sport but also agriculture, forestry and local authorities (1997/1998),
- organising a national competition for environment-friendly tourist locations in Germany, conceived as a practical trial for the introduction an environmental symbol for tourist centres demonstrating best practice (1996/1997),
- guidelines for environmentally friendly management of hotels, restaurants and camping sites,
- holding of a Federal competition for "Exemplary Camping Sites in the Countryside" under the auspices of the Federal Agriculture Ministry (1996),
- compilation of a set of criteria for the "Environmentally Oriented Tour Operator";
- support for the "European Blue Flag " campaign, which awards the flag for ecologically commendable seaside bathing beaches and leisure-boat marinas (in 1997 a total of 16 beaches and 122 marinas were awarded the European Blue Flag in Germany),
- setting up a working party on "Sport and Environment", which includes the manufacturers of sports equipment and is primarily concerned with analysing and assessing the impacts of new types of sport and leisure activities on nature and the countryside and developing ideas for resolving conflicts.

A range of different measures are also being taken by the associations and companies in the tourist industry and by sports and nature conservation organisations in an effort to protect nature and the countryside from the negative impacts of leisure and tourism activities and to improve the framework for ecologically sound recreation in the countryside. The activities focus in particular on measures to ensure that potentially harmful activities are concentrated on ecologically less sensitive sites, the creation of alternative attractions (for instance artificial lakes or rock-climbing facilities), the improvement of leisure opportunities in densely populated areas, greater promotion of ecologically oriented holidays, the holding of competitions, the awarding of prizes (e.g. the "Environment Prize" of the German travel agents association, the *Deutsche Reisebüroverband)* and eco-sponsoring (such as the *"Umweltgroschen"* or "penny for nature" scheme, which serves to fund nature projects and is run the *Europäische Reiseversicherung*, the European travel insurers association).

In October 1997, the central associations and organisations of the German tourist industry released a joint Environment Declaration in which they undertook to recognise sustainable tourism as a basic principle for the future development of their industry. The Environmental Declaration draws together previous environmental statements and decisions made by the individual associations and further develops them. It formulates ten guidelines for the sustainable development of tourism. There is a commitment to greater cooperation with partners outside the tourism sector. Moreover, the German tourist industry supports the development of internationally harmonised agreements and regulations for the sustainable development of tourism at global level.

The "Rohrhardsberg" model project (Black Forest) for the protection of capercaillie

The Black Forest (Schwarzwald) in the south-west of Germany is one of the most attractive and frequently visited recreational areas in Europe. Five million people live in its immediate catchment area for visitors. The Black Forest is also a valuable natural and cultivated landscape, offering habitats for many endangered animal species, such as capaercaillie and hazel grouse.

On Rohrhardsberg (1,152 m), the highest and largest mountain ridge of the central Black Forest, the conflict between recreational activities, espe-

cially between skiing (cross-country) and nature conservation concerns, has been particularly marked. By cooperating on a joint project, sports and nature conservation organisations, scientific institutions and public authorities have enabled these conflicts to be solved and the biotope to be saved for the capercaillie by means of intelligent strategies for controlling visitor flows (for example removing or restricting intrusive car access, re-routing ski-runs and footpaths), the creation of alternative centres for skiers and measures to upgrade habitats. This represents a major contribution to the maintenance of a stable capercaillie population in the Black Forest (totalling some 3,000 birds).

[Contribution by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety]

Cf. the contribution by the *Deutscher Naturschutzring e.V.* in the Annex: "Conference on "Ways forward for nature-friendly and landscape-compatible sport" held by the *Deutscher Naturschutzring* (DNR) ",

and the contribution by the Verband *Sport mit Einsicht e.V.* in the Annex:

"Initiatives by Sport *mit Einsicht e.V.* ",

and the contribution by the *Deutscher Verband für Landschaftspflege e.V.:* "Countryside stewardship associations: a model for successful cooperation".

5.6.11 Biotechnology / Genetic Engineering

The use of biotechnological methods can be observed in a whole number of fields of science and sectors of industry. They can contribute either to sustainable development by, for example, reducing energy requirements and cutting down on waste or to the use of renewable raw materials. Genetic engineering methods are employed for the same purpose as conventional breeding methods, for instance, to optimise organisms used in biotechnology, in particular by isolating, characterising and reproducing genetic information. Genetic engineering methods are also employed alongside other methods in the field of biological research. The extensive experience acquired over several decades has not so far shown that any additional risks can result from the application of biotechnological and genetic engineering methods.

The application of genetic engineering is governed by the Genetic Engineering Act, which is based on the principle of precautionary control. Thus, genetic engineering work, the release of genetically modified organisms and the marketing of products containing or consisting of such organisms are subject to notification, registration or licensing obligations. The Act requires that a relevant application be submitted to the competent authority. That authority examines all the relevant points and ascertains in particular whether the risks that genetic engineering work, release or marketing pose to human beings and the environment have been accurately assessed and whether any necessary safety measures have been taken. In performing their tasks, the authorities are supported by the Central Commission for Biological Safety *(Zentrale Kommission für biologische Sicherheit;* ZKBS) at the Robert Koch Institute. The ZKBS advises the Federal Government and the *Länder* on matters relating to the safety aspects of genetic engineering. It is comprised of experts from the relevant disciplines (including ecology) as well as informed representatives from the spheres of trade unionism, occupational safety, industry, environmental protection and research promotion.

Moreover, the environmental impact assessment procedure also investigates whether the activities forming the object of an application may threaten biological diversity.

5.6.12 Model projects and exemplary cooperation for the sustainable use of biological diversity

Conservation and development of the cultivated landscape: the "PLENUM" project in Baden-Württemberg

The conservation of biological diversity is a complex task that must be tackled using a variety of strategies and instruments. In addition to areas given site protection, other larger priority areas must also benefit from nature conservation measures.

In recent years the Baden-Württemberg *Land* Institute for Environmental Protection has developed a new strategy for expansive nature conservation

designed to extend the safeguarding of biological diversity to areas that go beyond those designated by the *Land* as protected sites. Landscape objectives have been developed for all of the *Land's* major landscapes. They are based on the existing biotope mapping survey of the entire *Land* and on other data and also apply to sites with particularly high biotope density.

The nature conservation goals for the selected sites must apply to large areas, for instance when preserving bogs or protecting species requiring expansive habitats. The conservation and development of extensively used countryside is extremely important.

In Baden-Württemberg, twenty such priority areas were selected for nature conservation, covering a total of 21% of the *Land's* area and taking in several of Baden-Württemberg's major landscapes. The project implementing the new nature conservation strategy in Baden-Württemberg has the acronym PLENUM *(Projekt des Landes zur Erhaltung und Entwicklung von Natur und Umwelt)*. The PLENUM project incorporates not only classic nature conservation goals but also new goals for integrating the land users. It is intended that extensively used areas continue to be managed by the local farmers. For this to work, nature conservation must be made worthwhile for farmers. At the same time, local residents are to be made aware of the problems facing their part of the countryside and take action to preserve its characteristic features. This entails going beyond pure nature conservation objectives and achieving sustainable economic activities in the region.

The region covered by the PLENUM model project "Isny-Leutkirch" includes two communities in the Oberschwäbisches *Hügel- und Moorland*, the natural area of hills and bogs typical of Upper Swabia. PLENUM's objectives comprise both nature conservation goals and goals for the sustainable development of the region:

Nature conservation goals in the narrow sense

- preservation of bogs, reed beds and still waters,
- extensification of their water catchment areas,
- protection of running waters and their banks,
- conservation and development of wet grasslands and oligotrophic meadows and pastures,
- conservation and development of semi-natural woods,
- conservation of landscape structures that link habitats.

Sustainable development goals

- maintaining traditional types of farm and increasing the use of organic farming methods,
- creation of marketing structures for goods produced by ecologically sound methods,
- development of nature-friendly and environmentally sound tourism,
- development of environmentally sound economic practices / protecting natural resources,
- nature-friendly and environmentally sound development of human settlements.

Efforts to apply the new strategy in the area began in 1995. Funds have been provided by the Land Ministry for Rural Areas and the *Land* Environment Ministry. Component projects are also being funded by the *Deutsche Bundesstiftung Umwelt*, a national environmental foundation. A PLENUM team was formed in the region to act as a multiplier for the PLENUM idea and a project group representing the most important social groups was set up to develop project proposals for achieving the aforementioned goals. Some steps have already been taken towards the marketing of beef produced in compliance with pro-conservation criteria. A special PLENUM land subsidy has been introduced for low-intensity farms, and various measures have been taken in the energy sector, such as the "Hundred Roofs" solar panel installation programme. Work will begin shortly on the construction of a dairy to make cheese from milk produced in accordance with PLENUM criteria. The dairy and the special beef marketing initiative also help to conserve biological diversity in the region, since the high value added to the products makes extensive farming management of the agricultural areas economically viable.

[Contribution by the Baden-Württemberg Ministry for Rural Areas]

Lange Rhoen, Black Marshland

Regional development strategy as seen in the Eider-Treene-Sorge Lowlands (Schleswig-Holstein)

The marshy lowland area located in the west of Schleswig-Holstein (about 60,000 hectares, approximately 40,000 inhabitants) has been subject to increasingly intensive use over the centuries as a result of settlement and drainage measures and land reclamation programmes. Over the generations, the people of the region became used to sustained improvements in living conditions thanks to the combined support of both central and regional authorities. However, in recent decades there has been an increasing disparity between the money and effort invested and the benefits generated.

This trend is underlined by two major problems:

- the overproduction of agricultural products,
- the sharp reduction in species diversity and the dramatic decline in the numbers of meadow birds.

Thus, working closely with the people of the region, a course of sustainable ecologically-oriented regional development must be pursued, while cushioning the impact of the necessary structural changes. This can only be done by adopting a long-term approach and holistic view.

The draft concept prepared by the *Land* government was further elaborated in a wide-ranging process of consultation and involvement. Much of this strategy has already been implemented. Its basic terms of reference and implementation steps are as follows:

- heightening awareness of the general development trends,
- assessing the regional data in working parties made up of experts from different fields,
- jointly designing long-term development strategies,
- developing and implementing integrated projects (for example in the field of nature conservation and agriculture, gentle tourism),
- securing the finances, preparing grant applications and promoting the implementation processes.

Significant components of the long-term development strategy have already been implemented:

- spatial priorities for the development of nature conservation and agriculture were specified by establishing, with a large degree of approval, boundaries for the priority areas for nature conservation measures,
- the efforts to promote the ecological development of the landscape were intensified, with some 9,000 hectares of the planned 12,000 hectares (long-term target constituting 20% of the total area) having already been secured for nature conservation,
- land consolidation procedures and other measures to promote ecological development and improve the agricultural structure were initiated on the basis of the development concept and successfully continued,
- the construction and expansion of local sewage farms and the enhancing their treatment capacity was continued, a programme which also encompassed home-based treatment units,
- progress was made in promoting exemplary individual projects to promote gentle tourism centred on the attractions of nature,
- long-established urban development and village renewal programmes were concluded, while others unfortunately had to be abandoned due to the lack of funding for urban development.

Central to the organisation is the commissioning of a coordinator for the *Land* government and the setting up of a regional office with two regional consultants to coordinate the large number of persons and bodies involved. This has ensured above

all that the normal administrative structures have been complemented by an information network facilitating cross-sectoral and transboundary coordination.

The *Land* government had decided in 1991 to make a medium-term allocation of a minimum annual average of DM 3 million for land acquisition in the area. Since 1991, a special budgetary allowance has been earmarked solely for concept realisation, for project development and for the acceleration of implementation. These funds have been spent mainly on regional extension, research and preparatory work, documentation and the development project components. In future, the financing is generally to be provided from the regular budget. In addition, European funds are to be brought in for co-financing wherever this is possible.

[Contribution by the Schleswig-Holstein Ministry for the Environment, Nature and Forests]

Cooperation based on partnership between social actors in Bavaria

Private individuals, organisations and local authorities have become increasingly willing to get involved in nature conservation. If this involvement is to be made as effective as possible, the state must act as a coordinator. This means that in future nature conservation work will increasingly become a management task in which the nature conservation authorities operate as advisers and negotiating partners. Bavaria has already taken a decisive step in this direction in recent years. For instance, in order to implement the Species and Biotope Protection Programme, over 100 projects have been initiated. Here, the support of external project managers has proved to be very successful.

The state has at its disposal a range of possible instruments for promoting the nature conservation efforts of private parties, associations and local authorities, such as:

- supporting the foundation of organisations:

  The state must encourage as broad as possible a range of private nature conservation organisations in society. For example, the tasks of local landscape and biotope management in Bavaria are increasingly being performed by country-side stewardship associations founded especially for this purpose. These associations are essentially supported by representatives of the farmers, nature conservation organisations and representatives of local government, with each group enjoying largely equal representation.

- dialogue and agreements with user groups:

  The state is increasingly interested in establishing dialogue with those groups in society whose activities have an impact on nature conservation concerns. At Land level, the most comprehensive initiative is the Environment Forum *(Umweltforum)*, which has several working parties concerned, among other things, with the sphere of nature conservation. There are also various sectoral efforts, such as the Bavarian Landscape Natural Heritage Initiative *(Intitiative Naturerbe Bayerische Landschaft)*, which seeks to foster closer cooperation with the Bavarian hunting, land owner and forest owner associations. It is hoped that the associations will be inspired to make their own contributions to the implementation of nature conservation targets. However, it is also important to encourage talks and agreements at local level. Steps in this direction are being taken by, for example, the "lake conferences" *(Seenkonferenzen)*, which establish a state-mediated dialogue as a contribution to resolving conflicts between the representatives of different user interests.

[Contribution by the Bavarian State Ministry for *Land* Development and Environmental Affairs]

The Barnim Workshop - an unusual initiative in Berlin

The Barnim Workshop *(Werkstatt Barnim)* is a forum of about 40 associations, organisations, community campaign groups, interest groups, administrative bodies and private individuals from the *Länder* of Berlin and Brandenburg. Its declared aim is to act as "a lobby for the countryside". The countryside in question lies to the north-east of Berlin. The aim of the Workshop is to develop a local recreational area that stretches beyond the boundaries of the city. In Berlin alone, 800,000 people live within the potential catchment area for local visitors.

What is special about the initiative is, firstly, that it is a coalition of actors who are already individually committed to the interests of the countryside and, secondly, that is has the unusual task of developing the countryside on the periphery of Germany's biggest city. It is a landscape that the population has not yet been able to see and experience, since the area does not even have access routes for walkers or cyclists and there are no recreational amenities.

In addition to constantly exchanging information on concepts, plans and projects, the workshop aims to:

- elaborate supra-regional planning principles and a viable, ecologically sound framework concept,
- develop implementation strategies,
- introduce new ideas into the spheres of policy-making, administration and industry and
- coordinate the work of actors in the locality in order to achieve maximum benefits for the area.

[Contribution by the Berlin Senate Authority for Urban Development, Environmental Protection and Technology]

Cf. the contribution by the research and development project "Contribution of the German Botanical Gardens to the Conservation of Biological Diversity and Genetic Resources", commissioned by the *Verband Botanischer Gärten e.V.* in the Annex: "The contribution of botanical gardens to the implementation of the Convention on Biological Diversity".

5.7. Protecting against chemical pollution and other environmental burdens

5.7.1 Chemical pollution

A multitude of different substances enter the environment every day. It is only in individual cases that science has so far been able to establish in detail just how the simultaneous or consecutive impact of different substances affects human beings or the environment in the long term and, for instance, whether the effects tend to cancel each other out or are mutually reinforcing.

We only have information on a limited number of substances with regard to the quantities released into the environment and how and where they enter. Yet even for these substances, little is generally known about how they behave in the environmental spheres they have entered. At any rate, we may assume that these chemicals are disseminated in air, water and soil and influence all components of biological diversity:

- habitats (for example, by changing the chemistry of soil and water and consequently the composition of biotic communities),
- species (for example, by direct toxic impacts),
- genetic variety (for example, by eliminating the more sensitive individuals, along with their unique genetic make-up, from the population).

Germany has achieved a high level of protection against chemical pollution. Progressive reduction in the inputs of a series of harmful substances into the environmental media has been achieved in Germany. It has been possible to sever the link between economic growth, on the one hand, and pollution from immissions, on the other, thus significantly improving the quality of the environment. This applies particularly to chemical pollution and chemical discharges into waterbodies. A case in point is the recovery of species diversity in the Rhine, which in some places has returned to levels similar to those recorded in the 1920s. The progress achieved is primarily due to the strict limit values imposed on harmful substance emissions from installations and on pollutant discharges into water. Regulations have been introduced for virtually all the pollution sources, including power stations (so-called large firing installations), industry, transport, agriculture and domestic households. The limit values are periodically updated in line with the best available technology and, to an extent, have even been applied to existing plants in the power and manufacturing industries. Progress has also been achieved in plant safety and legislation on chemicals.

The measures already taken were decisive in achieving, and in some cases exceeding, the targets laid down by the Third Conference on the Protection of the North Sea of a reduction, over the period 1985 to 1995, of between 50% and 70% in hazardous substances entering the North Sea via rivers. Efforts to combat eutrophication have succeeded in halving the level of phosphorus discharges into the North Sea. However, it has not yet been possible to achieve a similar reduction

in nitrogen discharges. Strategies to further reduce hazardous substances are currently being elaborated at both national and international level with the support of experts from industry, agriculture, marine conservation and the environmental organisations.

The statistics show a decline in the use of fertilisers (especially mineral types) since 1990/91. However, some areas of agricultural land in Germany display a marked excess of nitrogen and a somewhat less significant excess of phosphorus. Moreover, on about 90% of Germany's forest area, the critical loads (the threshold levels at which an environment can still tolerate or compensate for the chemical accretion) for nitrogen have been exceeded, in some places by a large margin, due to high levels of air-borne pollution. The main emitters are traffic (nitrogen oxide) and animal husbandry (ammonia). Rigorous implementation of the Fertiliser Ordinance should improve the situation.

Even though current inputs into the environment are falling, heavy metals and other non-degradable or poorly degradable contaminants have accumulated in food chains, the soil and the sediment of waterbodies and continue to pollute the environment.

A considerable amount of research still needs to be done into the effects of a large number of pollutants.

5.7.2 Other environmental burdens

Biological diversity is endangered by a series of non-substance factors influencing the environment. When, as often happens, several of these impacts are combined with each other or with the pollutants discussed above, it becomes impossible to identify a single factor as the source of a threat. Examples include:

- suburban sprawl, soil sealing and fragmentation of land,
- the earlier practice of landscape clearance, i.e. the removal of landscape elements such as copses, hedges, shrubs and minor waterbodies,
- ecological impacts of plant and animal species inadvertently brought in by humans or deliberately introduced into local habitats,
- the indirect impact of emissions that endanger the ozone layer and influence climate.

Krusselsheim

By international comparison, Germany is one of the countries with the highest density of infrastructural facilities for human settlements and transport. Landscape fragmentation due to the growing transport infrastructure has slowed down significantly in the old (western) *Länder*, but not in the new (eastern) *Länder*. The consequences of fragmenting the landscape will still be felt even if the underlying processes are retarded, and whilst it may be possible to mitigate these consequences by establishing a biotope network, they cannot be reversed.

Exotic species brought into local habitats intentionally or unintentionally by man and genetically modified organisms may have unforeseen ecological consequences and, in extreme cases, transform entire ecosystems.

In freshwater habitats the proportion of exotic species is particularly high. The same is true of taxa below the species level. Thus, the proportion of introduced species among the macro-invertebrate fauna of certain national watercourses (rivers and canals) approaches 30%. Both nature conservation legislation and hunting legislation provide for bans on or licensing requirements for the release of (exotic) species. Total control

is, however, impossible. The fishing laws of the *Länder* govern the release of native and non-native fish species, which is standard fishing practice.

Unaware of the potential consequences, private individuals occasionally release non-native species into the countryside where, under certain conditions, they may multiply and pose a threat to the native flora and fauna. Public education measures aim to raise awareness of the potential consequences of these actions.

In many respects, the fund of knowledge on which to base an assessment of the impacts of non-substance influences on biological diversity is still inadequate. For instance, little is as yet known about the consequences for plants and animals of increased UV-B radiation caused by a depletion of the stratospheric ozone layer. However, it is known that genetic diversity plays a role here, one example being the fact that many conifers in particular are able to reactivate protective mechanisms against increased UV radiation that they acquired during their evolution in an earlier stage of the Earth's history. However, this ability is no longer inherent in all taxa that are old in evolutionary terms. Phytoplancton, for example, can be damaged by too much UV-B radiation.

In order to avert these dangers, the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer set out a precise timetable for the global phasing out of the production and use of such substances. As part of a comprehensive national concept, Germany put into effect the world's first legally binding regulation in this field by enacting an ordinance to ban ozone-depleting substances (CFCs and halogens). As a result, the production and use of fully halegonised CFCs had largely ceased in Germany by 1994.

The emission of greenhouse gases such as carbon dioxide, methane and nitrous oxide results in a change in the composition of the atmosphere, so that it cannot be ruled out that the climate might be affected by the atmosphere's radiation balance.

These climate effects are, for the most part, to be expected in the future, although their foundations are already being laid in the present. In the case of carbon dioxide, the three largest sources in Germany are energy generation and transformation, the economic sphere of domestic households, institutions and industry, and transport and traffic. The climate changes that may occur will have a potentially far-reaching impact on the components of biological diversity. In these circumstances, species and/or populations whose natural speed of dispersion and migration is too slow for the rapid pace of the feared climate change and the predicted shift in vegetation zones will be threatened with extinction.

Since 1990 the Federal Government has been implementing a comprehensive package of measures as part of its climate protection strategy. To this end, it is applying a broad set of instruments that includes statutory requirements, economic instruments and other supporting measures (such as research, education and training, information and advice). The measures mainly apply to the areas of energy saving, energy efficiency and energy substitution (replacing carbon-rich fuels with lower-carbon fossil fuels and non-carbon-producing energy sources). Another approach is to promote carbon-neutral renewable sources of energy (especially wood), since no more CO_2 is released through their use than was previously absorbed by the plants from the atmosphere.

Considerable potential for reducing CO_2 and other greenhouse gas emissions also exists at local authority level. A detailed overview of climate protection measures taken in the Federal Republic of Germany is contained in the second report of the Federal Government (1997) submitted under the terms of the UN Framework Convention on Climate Change (UNFCCC).

Bird protection officer giving a tour

5.8 Education and research

5.8.1 Environmental education

The objectives of the Convention on Biological Diversity can only be implemented if there is social consensus on the need to actively safeguard nature and the environment. A crucial instrument for achieving this

consensus is environmental education. It is a question of stimulating people's sense of responsibility for the environment, which includes biological diversity, and consolidating this awareness in such a way that every individual behaves in an environmentally and ecologically conscious manner in all areas of life. Every individual must gear his or her actions to the limited capacities of the natural environment. Only when the necessity of sustainable development is firmly rooted in the consciousness of people in their various roles and positions in society will strategies for changing behaviour become effective.

Germany has a multi-level and efficient education system. Despite the differences in emphasis and approach, all the *Länder* have now made issues of safeguarding the natural basis of life an integral component of the school's educational mission. The *Länder* for whom the protection of the natural environment has constitutional status have also incorporated this constitutional imperative into their school legislation.

Considerable progress has also been made in the informal sector of environmental education. For many years, the Federal Government has been supporting environmental education projects carried out by associations, societies and others organisations, including projects that serve the specific goals of the Convention on Biological Diversity.

Environmental education in built-up areas as seen in Berlin

Recognising the important role of environmental education, the Berlin House of Deputies adopted a strategy in 1994 to secure and develop the city's school and informal education facilities for environmental education and nature studies. The concept aims at establishing a network of different educational facilities in the environmental sphere. In the school sector, the strategy requires steps to secure and expand an adequate number of gardening schools and field laboratories. This system is to be enhanced by non-school environmental centres, above all in the following areas:

- environmental education initiatives for children and young people in the informal education sector,
- basic, advanced and continuing vocational training in various disciplines in the field of environmental education and nature conservation,
- public education, advice and information for the community on questions of nature conservation and environmental protection.

Since 1994, it has been possible to maintain the number of environmental education facilities in Berlin and to upgrade them thanks to financial support from the *Land* government.

[Contribution by the Berlin Senate Authority for Urban Development, Environmental Protection and Technology]

The act to promote a Voluntary Ecological Year *(Freiwilliges Ökologisches Jahr;* FÖJ) which came into force in 1993, serves to promote education on the environment, including aspects related to the goals of the Convention on Biological Diversity. During the Voluntary Ecological Year, which fosters personal development and deepens environmental and conservational awareness through theory and practice, young people are given the opportunity to put their commitment to protecting nature and the environment into practice outside an educational or employment context.

The public relations and educational programmes of associations and other non-governmental organisations also play an important role in conveying information and knowledge, educating and raising public acceptance for issues of nature and species protection.

Cf. the contribution by the *Naturschutzbund Deutschland e.V.* in the Annex: " Public information programmes of the Nature Conservation Federation of Germany (NABU)"

Adult education centres, nature and environment centres, museums, zoos, wildlife parks and botanical gardens are some of the most important providers of continuing education who have long been incorporating environmental and nature conservation themes into their programmes. However, Nature Conservation Areas, National Parks, Biosphere Reserves and Nature Parks, which provide hands-on opportunities to learn about the role and workings of natural and semi-natural ecosystems, sustainable use of cultivation-based ecosystems and the importance of old livestock breeds and local varieties, also make a considerable contribution to educating people on the issue of sustainable

conservation and the sustainable use of biological diversity.

Cf. the contribution by Cologne Zoo on behalf of the *Verband Zoologischer Gärten* in the Annex: "Contribution of zoological gardens to environmental education".

Environmental education in protected areas: Harz National Park

More than 1,000 years ago, the Harz range of the Central German Uplands was transformed by mining into one of the most important industrial centres of Europe at that time. Hardly any other major forest area in the whole of Germany has been so radically transformed by mining as the Harz. Today, two large protected areas can be found in the Harz, namely the Harz National Park (Lower Saxony) and the Hochharz National Park (Saxony-Anhalt).

The Harz is now visited by some 10 million people each year. It is therefore only natural that the challenge of providing environmental and conservation education for the general public should have been taken up as a special mission. The Harz National Park is therefore creating an attractive educational system covering all the nearby tourist localities and geared towards all age groups, from pre-school children to senior citizens. The elements of this system include the Harz National Park Rucksack School, a model scheme for training people from the region to become National Park forest guides and thus act as multipliers, and the gradual establishment of either electronic information points or permanently staffed National Park centres in neighbouring localities.

[Contribution by the Harz National Park Administration, Braunschweig Regional Government, Lower Saxony]

The vocational training sector is also characterised by a performance-oriented education and training system that offers a wide variety of courses dealing with biological diversity, ranging from all the different biological disciplines, including biotechnology and genetics, through to specialisations involving agricultural and forestry management and science. However, there is a lack of educational provision in some important areas. Thus, the development of an integrative, cross-disciplinary approach combining traditional natural science, humanities and social science-based courses with training in engineering and technology is still in its infancy. In the nature conservation sector there is still no proper recognised profession with official training regulations.

Since 1992 discussions have been taking place on, among other things, a uniform further education regulation for all *Länder* to institutionalise the full-time supervision of protected areas. Agreement has been reached on the content and title ("qualified nature conservation and countryside steward") of the qualification to be recognised under the further training regulation (for which the BMU and the BMBF are the competent ministries). This regulation is due to come into force in the first half of 1998.

Biological field stations in North-Rhine/Westphalia

In North-Rhine/Westphalia there are now 27 biological field stations, some of which have been in existence for more than ten years. The tasks of these stations include overseeing nature reserves, observing and monitoring nature, performing biotope improvement measures, bringing people closer to nature by persuading land users to enter into contractual conservation commitments as part of existing nature conservation programmes, controlling visitor flows and organising fieldwork duties for school classes and nature conservation associations.

The biological field stations contribute to practical nature conservation on the ground. The aim is to develop a *Land*-wide network of biological field stations.

[Contribution by the North-Rhine/Westphalia Ministry for the Environment, Regional Development and Agriculture]

The nature conservation academies and other educational institutions of the *Länder* are also of special importance to education and further training specifically related to nature conservation. Their tasks include the basic and advanced training of official and voluntary nature conservation officers as well as the organisation and staging of specialist seminars and courses. The institutions provide these officers with the opportunity to specialise and acquire new knowledge throughout their career.

Bavarian Academy for Nature Conservation and Landscape Management

In addition to its work in the field of applied research, the Bavarian Academy for Nature Conservation and Landscape Management *(Bayerische Akademie für Naturschutz und Landschaftspflege)* has the task of promoting the exchange of knowledge and experience and of raising awareness of nature conservation issues in broad sections of the community by means of seminars, teaching programmes, training courses and public information activities. With a view to implementing the objectives of Agenda 21 in particular, the Academy is making increased efforts to offer target group-oriented seminars and courses. The Academy has gained a high international reputation over the 20 years of its existence and will be receiving special funding of nearly DM 30 million over the next few years to facilitate the establishment of an adult education and research centre.

[Contribution by the Bavarian State Ministry for *Land* Development and Environmental Affairs]

Concept of "woodland education" in Baden-Württemburg

The forest authorities of the *Länder* have long taken an active interest in forest-related environmental education. In Baden-Württemburg, for instance, "woodland education" is laid down in law as an educational mission to be performed by the forest authorities. They offer numerous guided forest walks and other educational events designed primarily to serve the needs of children and young people as their main target group. A cornerstone of the educational work of Baden-Württemberg's forest authority has been the establishment of four forest-based school hostels and the "Forest House", which are very popular centres for learning and directly observing and enjoying nature.

[Contribution by the Baden-Württemburg *Land* Forest Authority *(Landesforst-verwaltung Baden-Württemberg)*]

In cooperation with Dresden Technical University, UNEP and UNESCO, the Federal Environment Ministry (BMU) holds regular courses in environmental management for experts from developing countries. A comprehensive six-month course and two or three specialised courses of four weeks each are offered every year. In 1997, a short course was held on the subject of conserving biological diversity, in which the main topics were biotope mapping and ecological zoning.

The courses, which enjoy a high international reputation, influence multipliers in the developing and newly industrialised countries and thus offer an excellent opportunity for promoting know-how and technology transfer in these countries as part of the Rio follow-up process.

5.8.2 Research

Environmental research

Total expenditure by the Federal Government on environmental research has increased over the last ten years from around DM 500 million a year to over DM 1 billion. A substantial part of environmental research is concentrated on ecological issues. Here, the primary objectives of the ecological research funded by the Federal Government concerns the conservation and restoration of biological diversity and a healthy ecosystem as well as the sustainable use of cultivated landscapes. Greater understanding of ecological systems is vital for determining critical loads. Research into ecosystems therefore represents an important focus of ecological research.

The Wadden Sea ecosystem

Jointly financed research project on the Wadden Sea ecosystem

The Federal Environment Ministry (BMU), the Federal Education and Research Ministry (BMBF) and the *Länder* of Bremen, Lower Saxony and Schleswig-Holstein have been supporting a wide-ranging inter-disciplinary research project on the

ecosystem of the Wadden Sea. The *"Ökosystemforschung Wattenmeer"* is a jointly financed programme designed to establish a scientific basis for developing effective conservation strategies for the Wadden Sea. The current and final phase of the project runs until the end of 1998 and seeks to achieve an overall synthesis of the work completed to date. The numerous project components have already produced an extensive data base which may be used in performing monitoring tasks, identifying material flows and assessing existing pollution loads and uses of the Wadden Sea. This data is being collated with these needs in mind.

Most of the funds spent by the Federal Government on promoting ecological research go to non-university research institutions. The Federal Government also uses a considerable amount of its project funds for ecological research. Applications for these funds may be submitted by universities, non-university research institutions, the subordinate authorities of the Federal Government and the *Länder* as well as private-sector companies.

The Federal Research Ministry (BMBF) provides about DM 80 million annually in the form of project grants for ecological research. The aim of these grants is to identify possible means of revitalising and naturalising terrestrial and limnic ecosystems/landscapes, to develop strategies for sustainable use and to establish the necessary scientific basis for performing these design and management tasks. The promotion schemes are concentrated on semi-natural landscapes and cultivated landscapes such as forests, agricultural landscapes, river and lake landscapes as well as urban industrial landscapes. The broad inter-disciplinary topics on which research focuses are soil conservation, biotope and species protection and eco-toxicology.

In order to strengthen environmental protection efforts in the agricultural sector, the Federal Agriculture Ministry (BML) allocates project grants totalling around DM 3 million per year for the promotion of "research and development in the agricultural sector for the purpose of environmental protection". These measures are directed at the application of research and development findings inter alia in the field of natural resource conservation and development.

The BMU's project funds for environmental research currently amount to DM 53 million, of which DM 9.7 million is earmarked for nature conservation research. The BMU also provides support for testing and developing projects. Their purpose is the practical testing and development of research findings and new methods whose purpose it is to improve nature conservation and landscape management.

Substantial private funds are also available in Germany for investment in nature and the environment. One major private sponsor of environmental research is the *Deutsche Bundesstiftung Umwelt* (DBU). Established in 1990 on the basis of capital resources derived from privatisation, this national environment foundation is the largest private sponsorship agency for environmental protection in Europe. It makes about DM 140 million available in grants each year. Since its establishment, the DBU has awarded over DM 1 billion in grants. 57% of this sum has gone to companies in eastern Germany. An important funding area is applied environmental research. In future, the DBU will be increasing its support for biotechnology projects.

Each year the DBU awards the German Environment Prize. With prize money of DM 1 million, it is the most lucrative environmental prize in Europe and may also be awarded to personalities from abroad.

Research in the sectors of agriculture, forestry, hunting and fisheries

Federal Government research in the agricultural sector is mainly conducted by the research institutes operating under the auspices of the Federal Agricultural Ministry (BML). Agricultural research is dedicated, among other things, to the following tasks:

- it investigates the extent to which agricultural production processes impact on the ecobalance;
- socio-economic research in the agricultural sector is currently endeavouring to quantify ecological issues in economic terms;
- studies being conducted in the forestry sector focus on the concept of semi-natural forestry and of maintaining and sustainably using forests and their functions in terms of the supply of renewable raw materials, landscape and climate, biological diversity and genetic resources;
- fisheries research is mainly concerned with the study and assessment of fish stocks, the development of selective fishing techniques and the influence of fisheries on the marine ecosystem. Research has also begun into the technical aspects of fishing operations, since it is apparent that by simply setting quotas fpr catch sizes, stocks will not be preserved in the long term.

North Sea trawler

ing with the use of synthetic plant protection agents and fertilisers). Since conversion, the organic farm has demonstrated an increase in the number of animal and plant species, while on the integrated farm there has been a slight depletion. It has also been shown that soil erosion can be significantly reduced by practices such as converting parts of the land to eco-fallow.

Thanks to the close cooperation between different scientific disciplines, it will be possible at the end of the project to formulate recommendations for an ecologically sustainable and economically viable approach to the production of food. simply setting quotas for catch sizes, stocks will not be preserved in the long term.

Research into agri-ecological systems: *Forschungsverbund Agrarökosysteme München (FAM)*

Within the scope of its agrobiotic research programme, the Federal Education and Research Ministry (BMBF) has been funding a 15-year long-term project since 1993 which is concerned with the recording, forecasting and evaluation of use-induced changes in agri-ecological systems. Its aim is to identify appropriate measures for achieving optimum sustainable land use. The project is being carried out by the *Forschungsverbund Agrarökosysteme München* (FAM), a Munich-based research network encompassing 52 individual projects, including units at the *GSF-Forschungszentrum für Umwelt und Gesundheit GmbH*, the Technical University of Munich and the University of Marburg. FAM is the largest project of its kind in Europe.

FAM incorporates experimental studies to determine the control parameters of hydrological and metabolic processes and records the effects of different maintenance and management practices on the species composition and productivity of sites. A comparative analysis is being made at a field station of two experimental farms, with one following the guidelines of integrated crop growing (i.e. characterised inter alia by economical use of fertilisers and plant protection agents and by low-impact tillage) and the other operating in accordance with organic farming principles (i.e. dispens-

Development of ecological models for open, farmed landscapes in the Schorfheide-Chorin Biosphere Reserve (Brandenburg)

The Federal Education and Research Ministry (BMBF) and the national environment foundation the *Deutsche Bundesstiftung Umwelt* (DBU) are jointly sponsoring a project entitled "Nature conservation in open, farmed landscape as seen in the Schorfheide-Chorin Biosphere Reserve". The project is designed to develop effective approaches to integrated nature conservation management for a representative, farmed landscape in the Schorfheide-Chorin Biosphere Reserve (Brandenburg) and to test these approaches through practical experimentation. It is hoped to establish ways of managing this cultivated landscape that enable wild animal and plant species to thrive while also offering livelihoods for people working in the area.

This jointly-financed interdisciplinary research project brings together two strands of work that run simultaneously, i.e. the research work (funded by the BMBF) and the practical trials to test the research findings (funded by the DBU). Once scientists from different disciplines have assessed the existing situation, defined the desirable target conditions and formulated the measures needed to attain them, the results of the project modules will be collated and synthesised to form a common nature conservation and environmental protection goal. Having established specific targets, the task will then be to develop agricultural strategies with

which the targets can best be achieved for the whole area. The development of scenarios will allow the possible consequences of different regional models to be appraised, so that conclusions can then be drawn as to which forms of land use will best harmonise with nature conservation goals. It is hoped that this work will demonstrate ways in which the rural environment can be preserved in the future.

[Contribution by the Federal Ministry of Education, Science, Research and Technology]

Research on the influences of biological diversity in forests

Research into key factors influencing biological diversity in forests has been boosted by a BML-funded modular project and by other projects, especially those conducted at the Federal Research Institute for Forestry and the Timber Industry *(Bundesforschungsanstalt für Forst- und Holzwirtschaft;* BFH). In particular, the ÖKOGEN simulation programme developed at the BFH enables assessments to be made of what consequences different actions may have on the genetic components of biological diversity. The simulation models are being enhanced and refined to enable them to demonstrate human influences on species diversity, too. At present, priority is being given to studying the planting and rejuvenation of forest stands, the harvesting and treatment of propagation material, management of forest stands, long-term implications of events affecting the forest and the influence forest use has on species diversity with special regard to nature conservation and game browsing. As part of the research into forest damage, various studies have already been carried out on the influence of airborne pollutants on the genetic variety of woodlands.

[Contribution by the Federal Ministry of Food, Agriculture and Forestry]

Research on the development of viable and sustainable forestry

The Federal Ministry of Education, Science, Research and Technology (BMBF) is working on an interdisciplinary modular project designed to develop economically viable strategies for ecological, sustainable forest management. If the forestry industry is to accept forward-looking methods and be prepared to perform all the necessary additional management tasks, there must be a sufficient degree of economic feasibility. This approach requires integrated research into forest ecosystems, nature conservation and silviculture.

The scientific challenge taken up by the project is to combine the once largely separate branches of research:

- forest ecosystem research specialists must apply their knowledge of systems, their progressive analytical approach and their expertise in the modelling of ecosystems to conducting practical forest conversion experiments;
- the nature conservation research specialists must see their work as integrated research and apply their knowledge and their methods of analysis;
- the forest science experts have the task of scientifically monitoring, evaluating and comparing important experiments in forest conversion.

Dealing with a major part of Germany's terrestrial ecosystems, the project aims to provide a further example of how nature conservation research can be integrated into the management of cultivated landscapes.

[Contribution by the Federal Ministry of Education, Science, Research and Technology *(Bundesministerium für Bildung, Wissenschaft, Forschung und Technologie)*]

Biotechnology research

The Federal Government has declared biotechnology to be one of its research policy priorities. "Biotechnology 2000" is a targeted programme to foster the advancement of the basic research in this field and the wider practical application of this science. The programme centres on methods and procedures that serve human health and the protection of the environment. Each year the Government spends more than DM 1 billion on promoting research and technology in the biotechnology field. An annual sum of more than DM 330 million is currently being provided for the "Biotechnology 2000" programme alone. This is also supplemented by activities in other areas of research pro-

motion. Moreover, the BML spends over DM 100 million a year on promoting biotechnology research work in the field of renewable resources at nine of the ten Federal Research Institutes operating under its auspices.

Molecular research into natural substances

At the end of 1993 the BMBF invited the research community to submit proposals for "Molecular Research into Natural Substances" as a priority specialisation within the research programme. This initiative is intended to accelerate the development and application of molecular biological methods in natural substance research. The aim is to create new active substances for improved drugs and plant protection agents. Priority is given to projects involving the development of molecular biological test systems, the tapping of new sources of natural substances, and deriving the underlying structures of active substance synthesis. The initiative met with lively interest on the part of industry and the scientific community. It led to the creation of interdisciplinary research networks involving industrial companies and research institutions.

By the end of 1995, the Government had committed some DM 70 million in direct project funding. This commitment then led to the mobilisation of additional industry funding amounting to approximately DM 87 million.

[from: *Bundesbericht Forschung*, 1996]

5.9 Measures to implement the Convention on Biological Diversity through international cooperation

5.9.1 Development cooperation

5.9.1.1 Bilateral cooperation

The Convention on Biological Diversity has a major influence on the design of bilateral financial and technical cooperation projects in the fields of nature conservation, forestry, agriculture and fisheries. Through its financial and technical cooperation, the Federal Government supports some 150 projects in which conservation and sustainable use is either the main focus or at least one of the major components. Between around DM 150 and 200 million has been provided for these projects.

Nature conservation

Since as long ago as the mid-1980s, nature conservation projects undertaken as part of German development cooperation have increasingly focused on the care of natural areas and preservation of biodiversity. The intention is to support the developing countries in their efforts to preserve their natural resources and use them in a sustainable way, taking into account their ecological, socio-cultural and economic significance and also respecting traditional and semi-natural methods. As well as the designation of conservation areas, an important component has, from the outset, always been the sustainable management of biological resources, particularly in the buffer zones surrounding conservation areas, with the participation of the local population. The promotion of ecotourism or the extraction of basic pharmaceutical substances are just two examples of how this can be achieved.

The following measures and activities are commonly supported in our partner countries:

- development and promotion of nature conservation strategies and instruments:
  - involvement in the formulation of national nature conservation strategies,
  - improvements in legislation and regulations,
- establishment of effective institutions and organisations in the field of nature conservation:
  - basic and further training in nature conservation issues,
  - establishment of efficient nature and wildlife conservation structures,
  - equipping of nature conservation authorities,
- promotion of the status of nature conservation within society:
  - intensified education and public relations,
  - development of incentives for environmentally sound behaviour,
  - development and consolidation of conflict resolution mechanisms,

- management of conservation areas:
  - identifying and designating conservation areas and buffer zones,
  - implementing management plans in conservation areas and buffer zones,
  - programmes for species protection and habitat management,
  - establishing networks of natural areas.

Project example: game management in the Selous Reserve in Tanzania

Covering a total area of 50,000 km², the Selous National Park in the southeast of Tanzania is Africa's largest nature conservation area and represents one of the last great expanses of African wilderness. Its ecological resources have still hardly been touched by human interference: 75% of the Park's area is covered by miombo forests. Within the Reserve's boundaries there are several river systems with wetland areas, gallery forests and open grass steppe. UNESCO has designated the region a World Natural Heritage Site. However, agriculture and growing demographic pressures are becoming an increasing threat to the future of the Reserve. The worst damage has been caused by commercial poaching and illegal logging. The authorities have not yet succeeded in practising effective nature conservation management.

The abundance of wildlife in Tanzania remains the foundation of a flourishing tourist industry, which is the country's major source of foreign exchange. The losers in the tourism-led economic boom have, however, been the communities living around the margins of the Reserve. For they are not reaping the benefits of tourism, yet have to cope with constant damage to their farms caused by wild animals.

The project is designed to enable the villagers to benefit from the abundance of wildlife in their local areas. The aim is, on the one hand, to allow regulated hunting that will provide the inhabitants with game for their own meat requirements and, on the other, to minimise the impact on the natural populations. Wildlife committees, set up to represent local farmers, are currently permitted to bag 480 meat animals per year and gamewardens keep watch to ensure that the quota is observed and no protected species are shot. Since the introduction of this system, poaching has declined considerably. Although controlled hunting is even permitted for elephants, their population has expanded from 30,000 to 52,000 thanks to the almost complete cessation in the poaching of this animal.

Project measures also include the promotion of limited game tourism and of eco-tourism, improvements to the infrastructure in the park and institutional capacity-building of the park administration. Self-help schemes are being promoted for the communities in the peripheral zones and the revenues from the park are to be increased to a level that will permit economically and ecologically sustainable development.

The project began in 1988 and is currently due to run until the end of 1998. The financial support provided amounts to DM 14.5 million, of which DM 4.3 million covers the present promotion phase (1995-98) and DM 2 million is for setting a telecommunications system.

[Contribution by the Federal Ministry for Economic Cooperation and Development *(Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung)*]

Bay duiker

Forestry and forest conservation

The preservation and management of forest resources will only have a realistic chance of success if it is adapted to the economic, social and other concerns of those living in or around forest areas and if it becomes an integral part of a national development policy that is sustainable and makes sparing use of natural resources. This is why it is so important to use development co-

operation to support the partner countries in improving both their forestry policies and planning programmes and the relevant framework conditions. Efforts to solve disputes over the use of tropical forests by means of consensus-oriented forest strategies are therefore also important, as is the equitable sharing of the benefits and burdens of tropical forest and forest management programmes.

In forestry-related cooperation, multi-sectoral projects are increasingly being carried out with the aim of improving the use of land and resources at regional and local level, increasing the involvement of target groups and facilitating the necessary adjustment of the forestry policy and institutional framework. These projects attempt to combine measures to protect valuable forest areas with controlled use of forest stands in accordance with the principles of sustainable forest management.

Rainforest, Cameroon

In order to ensure that there is a consistent policy on the conservation of the tropical forest, to make project management by the national executing agencies easier and to improve coordination with projects funded by other donors, tropical forest projects are brought together in National Forest Programmes or comprehensive programmes supported by several donors. The largest integrated tropical forest programme funded by the German government is the "International Pilot Programme for the Protection of the Tropical Rainforests in Brazil"/PPG7. This programme is intended to serve as a model. The strategies developed here should, wherever possible and appropriate, be applied in other areas and regions. The following project example is one component of PPG7.

Project example: safeguarding forest protection zones in Brazil

In terms of global climate and biological diversity on Earth, the most important contiguous region of tropical forest in the world is in Amazonia. Changes in land use in the Amazon region have accelerated dramatically since 1980. The designation of protected forest and vegetation zones and their amalgamation in a national system of protected areas of various categories is one of Brazil's strategies for safeguarding its natural heritage within the scope of the national environment programme.

The federal government and individual states have in the past designated as many as 328 protected areas, comprising a total area of about 25 million hectares. Yet this has not achieved the objective of ensuring that areas of unique biological and ecological diversity remain untouched, either at federal or at state level.

Within the framework of bilateral financial cooperation, which is handled by the German Development Bank, the *Kreditanstalt für Wiederaufbau* (KfW), Germany contributes a total sum of DM 30 million to the protection of species diversity, climate, water quality and soil fertility in the Amazon region. The project also includes technical cooperation measures, which are carried out by the German Agency for Technical Cooperation, the *Deutsche Gesellschaft für technische Zusammenarbeit* (GTZ) and received funding of DM 3.5 million in total.

The aim of the project is to provide permanent safeguards for seriously threatened protected areas and to consolidate the Brazilian protection system SINUC. By meeting the costs of equipment and transport, financing communication systems and covering operating expenses, the project secures the existence of 31 forest protection zones (national parks, biological and ecological reserves). The project forms part of the comprehensive national

environment programme, the PNMA, which covers not only the aspect of protected areas but also extensive capacity-building measures to strengthen the national environment authority *Instituto Brasilieiro do Meio Ambiente e dos Recursos Renovaveis* (IBAMA) and environment authorities in the individual states. PNMA also includes measures to preserve specific ecosystems in the Mata Atlántica coastal region and the Pantanal wetland area. To achieve this goal, it is intended to streamline planning documents in selected protected areas and establish co-management between the IBAMA and appropriate non-governmental organisations. A monitoring system is being organised to ensure continuous supervision of measures being implemented. The project will result in the improved management of resources by consolidating Brazil's protected areas system, securing it on a long-term basis and building the capacity of national institutions.

[Contribution by the Federal Ministry for Economic Cooperation and Development]

The strategy of promoting the tropical forest pursued in the development cooperation sector is being further developed on the basis of experience gained from current projects, using project evaluations, research contracts and strategy analyses. By means of expert discussions and regular consultations, it is possible to benefit from the knowledge of other donors and non-governmental organisations.

Since 1988, the German government has trebled the funds available for forest-related projects in development cooperation. With an annual DM 250 - 300 million earmarked for this purpose and the contributions made as part of European and multilateral commitments, Germany is one of the world's largest financial donors in this sector.

Agriculture

The aim of sustainable agricultural development, as promoted by means of bilateral cooperation, is to establish a form of agriculture that is sound in ecological, socio-cultural and economic terms and that makes sparing use of the natural resources of soil, water and biodiversity so that they remain intact for future generations. In general, all measures implemented in the name of ecologically sustainable agricultural development, such as the use of integrated plant protection methods or reductions in soil degradation, contribute to the conservation of biodiversity.

Agricultural development aidproject in Peru

However, through measures aimed at establishing sustainable agricultural practices, the partner countries are given specific assistance regarding the conservation and sustainable utilisation of the biodiversity of useful plants and domestic animals, of the micro-organisms necessary for maintaining the fertility of the soil and of the useful organisms that can be used in biological pest control.

The first measures for the conservation of endangered genetic resources were implemented as early as the beginning of the 1970s. These were largely limited to support for national gene banks (e.g. Ethiopia, Costa Rica, Kenya, Bangladesh, Morocco, Sierra Leone) and the *ex-situ* conservation of resources and establishment of live collections. These were complemented by measures enabling comprehensive quality analyses to be conducted, thus allowing the genetic material to be more effectively used for breeding and research purposes.

Precedence is now given to the conservation of local varieties and animal breeds in their natural environment *(in situ)* and of the associated knowledge, as well as the use of these varieties and strains for breeding purposes.

Measures aimed at the conservation and use of biodiversity are either carried out as specific projects or are integrated into wider projects or programmes, e.g. the promoting of farming and household systems, integrated plant protection, rural regional development, the development of the seed sector, the promotion of pasture farming, livestock farming, fishery, agroforestry and agricultural research. The main aim of these measures is to support the rural population in both preserving and benefiting from its resources. The partner

countries are supported *inter alia* in the following activities:

- developing national and regional strategies and plans of action,
- building or consolidating suitable local, national and regional capacities and structures,
- creating access to technologies, particularly biotechnology, that lead to the improvement or enhanced efficiency conservation and use techniques,
- advising on technical, economic, legal and biosafety matters, e.g. *in-situ* conservation, means of improving and capitalising on local plant and animal resources, biological plant protection, the application of new technologies (e.g. biotechnology) and the improvement of traditional technologies,
- providing basic and advanced training,
- facilitating supraregional cooperation through networks.

Project example: promotion of seed production in the informal sector, Zimbabwe

In close cooperation with locally active NGOs and farmers' organisations, the project is assisting the conservation and use of traditional local varieties and new breeds and promoting on-farm seed production. The aim is to develop ways of improving the availability of appropriate seed stock by means of community and village-level production. It is also intended to establish a greater number of seed varieties and to promote the exchange and sale of seeds as an additional source of income.

This project in southern Africa was initiated in response to the significant shortages experienced in the supply of open-pollinating varieties despite the presence of a very well organised seed industry, and the increasing disappearance of traditional local varieties, which is drought-related. Priority had to be given to promoting the informal on-farm seed production sector to secure the supply of seed stock to farming households.

The results achieved so far include:

- great interest and enthusiasm on the part of farmers in addressing all aspects of seed supply,
- a growing awareness among farmers that local varieties are part of their culture and worth "saving",
- that it only makes sense to improve the production of seed stock and the *in-situ* conservation of local breeds in connection with efforts to promote other improvements in such areas as cropping techniques, soil fertility and the use of small implements,
- that the farmers are very good at engaging in the necessary dialogue with the researchers (breeders) and that the latter are for their part also keen and willing to take on board the farmers' ideas,
- that it has not been uncommon for farmers visiting the research centres to be surprised to find this or that old local varieties they thought had disappeared and then to ask for seed to start growing them again.

So far, the project has clearly shown that the on-farm seed industry can only be promoted in close cooperation with, and complementary to, the formal seed production sector. Progress here must be based on mutual acceptance among NGOs, farmers' organisations, the representatives of the formal seed industry, the private sector and the research community. Policy and legislation on seed must permit the exchange and sale of seed stock in the informal sector and thus open the way to on-farm seed production that will, through the production of mixed cultures, receive some economic incentives for *in-situ*/on-farm conservation of local varieties. The project has taken on the role of a mediator within this complex web of relationships and circumstances. In the course of the next phase, the project is now to be extended to operate in other SADC countries.

[Contribution by the Federal Ministry for Economic Cooperation and Development]

Fisheries and aquatic resources

The aim of development policy cooperation in the fisheries sector is to maintain and improve food supplies, to generate and safeguard a source of income for the poorer sections of the population and to maintain coastal biodiversity and aquatic resources. As part of this strategy, the following projects are supported in the partner countries:

- conservation, rehabilitation and sustainable utilisation of the aquatic resources of the sea and inland waters,

- catching and processing techniques that conserve resources, and promotion of marketing,
- integration of aquaculture in farming systems in inland areas and on the coast,
- advice on issues of policy and management; establishment of an infrastructure to facilitate the efficient control and monitoring of resource utilisation (including research into marine ecosystems and biological surveys),
- development of concepts for the sustainable use of mangrove swamps for fishery and aquaculture purposes,
- promotion of appropriate technologies in fisheries and aquaculture.

In projects in this sector, particular account is taken of knowledge on the ecological significance of a resource and its immediate relation to other resources. Thus it may be decided that a particular resource is not to be used, for example in order to conserve fish stocks and their biodiversity and, therefore, the associated potential for genetic regeneration.

Fish traps, Cotonou, Benin

Project example: lagoon fisheries in Benin

Covering an area of over 300 km², the lagoon system in the south of Benin is one of the largest in the Gulf of Guinea. The project area comprises the three départements of Mono, Atlantique and Ouémé. Around 4,000 people here earn a living from fishing, fish processing and the fish trade.

Most of the once dense mangrove forests were cut down for firewood in just a few years. This caused a rapid depletion in species diversity and a decline in fishing yields. Not only are mangrove forests one of the most species-rich biotopes on Earth, they also serve as vital spawning and maturation grounds for many fish species, which stay in the waters of mangroves in the juvenile stages of development before moving out to sea.

The mission pursued by the project, which has been in operation since 1986, is to restore the ecological balance of the lagoons and introduce ecologically compatible management systems designed to ensure a long-term sustainable basis for the livelihoods of the fishermen, mussel gatherers and other people who live from the lagoons.

Cooperating closely with the target group, the project arranged for more than two million mangrove seedlings to be planted over a period of several years, with the result that today large areas of the lagoons are again covered with mangroves of up to five metres in height.

In particular, any changes in fish stocks have been monitored and documented in the course of the project. This work has clearly shown that there is a direct correlation between the increase in mangrove cover and the recovery of the fish population. It may also be assumed that this is an indicator for a general return to greater biodiversity.

Since the inhabitants of the lagoons have for the most part taken charge of planting the mangroves and overseeing the new growth, it may be assumed that the success of these measures will be sustained in the future.

[Contribution by Federal Ministry for Economic Cooperation and Development]

Supraregional project for the implementation of the Convention on Biological Diversity

To accelerate implementation in the developing countries of those measures contained in the Convention that are binding under international law, a special sec-

tor project, entitled "Implementation of the Convention on Biological Diversity" was established under the auspices of the *Gesellschaft für technische Zusammenarbeit* (GTZ), with DM 8.5 million in technical cooperation funding provided thus far. This sector project provides a framework for individual measures aimed at improving conditions for the implementation of the Biodiversity Convention in certain contracting states. The intention is to enable selected institutions in developing countries to implement the key aspects of the Convention. The project is adapted to conditions in each particular country. Efforts may be directed both towards building the capacities of the institutions concerned during the entire process of compiling inventories and designing national biodiversity strategies, and also towards promoting individual components of the Convention (clearing house mechanism, in-situ and ex-situ measures, access to genetic resources). Thus, support has, to date, not only been directed at producing studies to record the extent and possible uses of biodiversity but also at developing national nature conservation strategies and at capacity-building in the developing countries themselves to facilitate implementation of nature conservation projects.

Research

In order to further develop its policies on protection of the environment and natural resources, the Federal Government promotes practice-oriented research in support of projects as part of its development cooperation efforts. The intention is to remedy gaps in our knowledge on the interplay of factors in tropical ecosystems and to improve project planning.

Rainforest, Philippines

There is still a great need for research into tropical forest ecosystems (Fourth Federal Government Tropical Forests Report, 1995). As part of a further, supraregional project entitled "Promotion of Tropical Forest Research", the Federal Ministry for Economic Cooperation and Development (BMZ) provides financing for the following areas:

- support from forestry scientists for natural forest management and afforestation measures,
- amassing of traditional knowledge on the forest,
- identification, development and marketing of new forest products.

The project concentrates on the regions of South America and South-East Asia.

The Federal Research Ministry (BMBF) and the BMZ have agreed to coordinate measures in the area of applied tropical forest research. Both programmes focus on Brazil (the Amazon region, the tropical coastal forests (Mata Atlántica) and the large expanse of wetlands in Pantanal). In the SHIFT research programme, "Studies of anthropogenic influences on forest systems and flood regions in the tropics", for example, efforts are being intensified to investigate options for long-term, non-shifting agricultural use of tropical forest regions, parts of which have already been cleared and settled. The knowledge gained from these projects can be useful in ensuring that areas already being used are not degraded and exhausted after only two or three years, following which they are abandoned and new areas rapidly cleared to provide fresh agricultural land. Instead, the intention is to maintain these areas as productive land for many years, thus offering the people a livelihood.

The simulation model ÖKO-GEN (cf. Chapter 5.8.2), which was developed by the Federal Research Institute for Forestry and Timber Industry Studies *(Bundesforschungsanstalt für Forst- und Holzwirtschaft;* BFH) and successfully applied in moderate climes, is to be adapted in cooperation with the Brazilian partners to conditions in the tropics. Simulation studies should help to provide information on genetically sustainable management of the eastern Amazonia and on the conservation of the genetic diversity of keystone species.

Since 1997, the BMBF has been jointly funding the cooperative project WAVES (Water Availability and the Vulnerability of Ecosystems and Society) together with the Republic of Brazil. WAVES is investigating the relationships between climate changes, water shortages and human migration from the hinterland to the coastal areas of three regions of north-eastern Brazil. It is hoped that the research project will provide a comprehensive analysis of the interactions between climate, geosphere, hydrosphere, biosphere and anthro-

posphere, while also indicating ways of achieving a sustainable improvement in living conditions and developing strategies and recommendations for action to protect semi-arid areas from the negative impacts on possible climate change.

The Supporting Programme for Tropical Ecology run by the GTZ is designed *inter alia* to initiate project-supporting environmental research and to make greater use of tropical ecology know-how in the form of flexible support for development cooperation in environmental issues. Not only German scientists but above all students and young scientists in the developing countries are involved in the programme. Applied research should be given priority. Currently the programme is concentrating on the following areas:

- ecology and plant protection,
- soil fertility and biological indicators,
- ecological economy
- ecology of tropical forest systems,
- biodiversity.

Development cooperation funds are also used to provide institutional support to the Centre for International Forestry Research (CIFOR) in Bogor, Indonesia, which concentrates its research on the conservation and improvement of the forests' genetic resources, the development of natural forests and the ecologically sustainable management of forests.

The Federal Government supports research in the field of agroforestry by promoting the International Centre for Research in Agro Forestry (ICRAF) in Kenya. The ICRAF's work programme and mandate involve compiling inventories of existing agroforestry systems, analysing them and using applied research to develop them further.

The conservation and sustainable use of biodiversity is an increasingly important factor in the support accorded national and regional institutes for agricultural research and development (for example the IICA, CATIE/Cost Rica, ICIMOD/Nepal), regional research networks and national research programmes.

Technology transfer as part of development cooperation

A major commitment contained in the Convention on Biological Diversity concerns facilitating the transfer of technology. German development cooperation also contributes to technological cooperation in a wide variety of ways. In its projects, it supports the transfer of scientific and technical knowledge, provides advice in organisational and management matters and supplies equipment. Technologies can be deployed all the more effectively given conducive economic conditions and the right kind of political and institutional framework in the partner countries. Developing countries can also use the technologies available all the more efficiently and effectively given high technological skills. That is why capacity-building in the developing countries is of such vital importance in cooperation and technology transfer.

Factory for solar-powered water heaters, Niger

Bilateral projects also facilitate cooperation in the field of biotechnology. Bilateral programmes aimed at the practical implementation of sufficiently developed technologies have been made a funding policy priority by the BMZ. The measures supported range from traditional biotechnologies to the application of modern cellular and molecular biology techniques for diagnostic purposes and *in-vitro* techniques. One special sectoral project is concerned with developing the basic organisational and legislative framework for applying biotechnological techniques in plant production. Taking into account local ecological, economic and social conditions, the aim is to identify examples of suitable mechanisms for transferring biotechnological techniques and products and also to develop structures that will enable the consequences of the application of new techniques to be predicted.

Environmental impact assessment

One major aspect taken into account when undertaking development cooperation in the area of environment and natural resource protection is the environmental impact of projects. The aim of the assessments, introduced in 1988, is to ensure that, for example, development projects undertaken in forest areas that are not directly linked to forestry, such as road construction,

Slash and burn in the rainforest

power generation and supply or the exploitation of mineral resources, do not lead to irresponsible destruction of forest areas, losses in biodiversity or any other kind of degradation. Over the last few years, development cooperation efforts have also increasingly focused on supporting the establishment and operation of national environmental institutions in order to enable the partner countries to carry out environmental impact assessments of their own measures as well.

5.9.1.2 Multilateral cooperation

Global Environment Facility (GEF)

In the Convention on Biological Diversity, the industrialised countries entered into a commitment to provide financial support to enable the developing countries to carry out measures required for the implementation of the Convention's provisions. A financing mechanism was established for this purpose and the "Global Environment Facility" entrusted - for the moment on a provisional basis - with its administration. This multilateral fund, jointly managed by the World Bank, UNDP and UNEP, was set up in 1991. Financing is available to developing countries, the countries of Central and Eastern Europe and the CIS. The GEF gives grants for investments and technical consultancy in the areas of climate protection, conservation of biological diversity, protection of international waters and protection of the ozone layer. Grants are provided solely to cover incremental costs incurred through measures of global benefit. The GEF council bases its guidelines for the use of funds on the tasks defined in the Conventions and the programme priorities identified by the Conferences of the Parties to the Conventions. The fund was replenished by approximately US$ 2 billion for the 1995-97 period. Germany's contribution amounts to some DM 390 million or 12% of the total volume. So far, the GEF has provided around US$ 450 million in the "biodiversity" funding area.

In the negotiations on the third replenishment of the fund, the Federal Government is making every effort to ensure that the GEF has sufficient finances to perform its tasks.

Trust-fund cooperation with international organisations

Although trust-fund cooperation with international nature conservation organisations is just one small aspect of the Federal Government's involvement in the international implementation of the Convention on Biological Diversity, it nevertheless provides vital support in strengthening these institutions. These non-governmental organisations can play an important integrative role in international discussions and convention negotiations, since their experience and their findings are recognised and respected internationally, in both developing and industrialised countries and by both governmental and non-governmental players.

Since 1992, the BMZ has, through its trust-fund cooperation arrangements, supported projects carried out by the following environmental NGOs: World Wide Fund for Nature (WWF, Gland), World Conservation Union (IUCN, Gland), World Resources Institute (WRI, Washington) and the International Institute for Environment and Development (IIED, London).

The Federal Government also provides funds in trust to enable UNESCO to promote supraregional tropical forest conservation and environmental education projects as part of its activities in the field of natural resources management.

Debt relief

At both bilateral and international level, the Federal Government is engaged in attempts to overcome the debt problems of the least developed countries. In addition to the Paris Club's bilaterally and internationally coordinated debt relief measures, to which Germany contributes, the Federal Government also grants debt relief in the form of debt swaps to those highly-indebted poor countries that have agreed with the IMF on an economic reform programme, if the funds released within the country concerned are invested in environmental protection. Between 1993 and 1995, funds of DM 240 million were authorised for use in waiving claims within the framework of such debt servicing ar-

rangements. To date, the Federal Government has entered into agreements to this effect with Bolivia, Côte d'Ivoire, Congo, Ecuador, Honduras, Jordan, Peru, Vietnam, the Philippines, Nicaragua and Cameroon. The domestic counterpart funds have mainly been invested in tropical forest and nature conservation.

International Agricultural Research

Germany's contribution to the Consultative Group on International Agricultural Research (CGIAR) is managed by the BMZ and implemented by the *Gesellschaft für technische Zusammenarbeit* (GTZ) in a project entitled "Promotion of international agricultural research". Support is provided to 16 international agricultural research centres, either through targeted contributions to ongoing programmes or promotion of specific projects, such as CIFOR, ICRAF and IPGRI.

International agricultural research aiming to prevent famine

The project contributes to poverty alleviation, food security and the conservation of resources in developing countries. These objectives are to be achieved by means of the following measures:

- promotion of the centres research initiatives and programmes - involving, as far as possible German partners and experts from developing countries,
- strengthening the partner countries' own agricultural research establishments,
- improving cooperation between national, regional and international research institutions,
- mobilising the knowledge and experience of those German institutions that primarily conduct research into the tropics and sub-tropics in order to advise the Federal Government on scientific matters and also to facilitate more intensive cooperation with national research establishments in the developing countries,
- applying the innovations of international agricultural research in development cooperation.

Individual projects or programmes normally run for a period of three years. Germany provides total funding of around DM 35 million per year.

The conservation and utilisation of biodiversity is one of the CGIAR's most important programme areas and most of the centres promote activities in this field (among other things, over 500,000 different strains are kept).

Germany's support for the CGIAR also focuses on the areas of "Preserving biodiversity in agriculture" and "Using plant genetic resources"

5.9.2 Other international cooperation

International water protection commissions

In order to reduce pollution burdens on transboundary rivers, the countries bordering on these rivers cooperate with each other on the basis of multilateral agreements in various international water protection commissions. Such commissions exist for the Moselle, Saar, Danube, Oder, Elbe and Rhine, and for Lake Constance. The more recent conventions also contain, in varying degrees, provisions on nature conservation and recommendations on environmental impact assessments for planned projects.

Conservation and improvement of biological diversity on the Elbe

One of the central tasks of the International Commission for the Protection of the Elbe *(Internationale Kommission zum Schutz der Elbe*; IKSE), which was formed on 8 November 1990, is to establish, as far as possible, a semi-natural ecosystem with a healthy diversity of species in the catchment area of the river Elbe.

Compared with similar European rivers, many sections of the Elbe and its riverside meadows dis-

play largely semi-natural structural characteristics. They offer a unique habitat for a large number of animal and plant species threatened with extinction or decline.

This is underlined by the large number of protected areas that have been established along the Elbe. However, many sections have been severely impaired by various human interventions. Measures are needed here to restore semi-natural conditions.

The IKSE took a first step in this direction by adopting an emergency package of ecological measures in 1993 to protect and enhance the Elbe's biotope structures. So far the proposed measures have only been implemented in part. All other proposals for greater protection and enhancement of biotope structures in the Elbe and its riverside meadows ultimately depend on the creation of a continuous biotope network along the Elbe.

More ambitious measures and strategies to achieve this objective were set out in the Elbe Action Programme submitted for implementation to the Parties in 1996. The programme covers the period from 1996 to 2010 and, in its ecological section, provides in particular for schemes to improve the biotope structures and riverbank regions along with measures to ensure that fish can migrate freely. Ecological studies are gradually being completed for a whole number of important tributaries of the Elbe in Germany and the Czech Republic as a basis for the protection and development of aquatic structures and bank regions.

[Contribution by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety]

Atlantic Salmon

The "Salmon 2000" Progamme of the International Commission for the Protection of the Rhine against Pollution (ICPRP)

Salmon was for many centuries among the common and frequently used fish species in the Rhine, until it was pushed to extinction by human intervention in the Rhine system. Since 1993, the countries in the river's catchment area have carried out various water protection projects as part of the Rhine Action Programme, known as "Salmon 2000". These projects are implemented under the auspices of the ICPRP and with support from the EU. The aim is to facilitate the return of salmon and other migratory fish by the year 2000 by improving the ecosystem of the Rhine and its tributaries. This aim requires close cooperation between all the riparian countries along the Rhine and its tributaries (The Netherlands, Germany, Luxembourg, France and Switzerland).

Since the salmon have become completely extinct in the Rhine system, new stock has to be built up. This demands large-scale stocking measures over several decades. The sea trout, on the other hand, still survives in the Rhine system and its numbers are to be boosted on the basis of natural reproduction and captured spawners. In the case of salmon, the fish eggs are taken from various European wild stocks and raised to the juvenile stage in fish farms or incubators located in the river system it-

self before being released. It is hoped that broad genetic variety will allow new salmon populations to develop that are adapted to this habitat.

Further measures to implement the "Salmon 2000" Programme concern improvements to future breeding habitats for salmon and sea trout, the mapping and removal of obstacles to fish migration (for instance, by constructing fish bypass channels at weirs and dams). These steps are accompanied by progress reviews, inventories and auxiliary research projects. The Programme has already shown some success. In almost all the waters being stocked, there is evidence that salmon have reached maturity. In the river Sieg in North-Rhine/Westphalia, where stocking began as long ago as 1988, salmon began returning from the sea in 1990 and have been breeding naturally since 1994. The French caught the first new salmon in the Upper Rhine in 1995, thus demonstrating that the stocking measures undertaken in 1992 and 1993 in the Alsatian Rhine tributaries had succeeded.

[Contribution by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety]

Transboundary and international cooperation

The conservation of biological diversity requires cooperation that transcends national borders. Owing to Germany's federal structure, many areas of transboundary cooperation fall within the remit of the *Länder.* Many associations have developed their own initiatives in cooperation with partners beyond Germany's frontiers.

Transboundary cooperation between the Free State of Saxony and the Czech Republic and Poland

As long ago as 1991, the environment ministries of the Free State of Saxony and the Czech Republic reached an agreement on cooperation on matters of nature conservation in their mutual border region. This agreement, originally valid for five years, has since been extended. It establishes a framework for cooperation to be institutionalised in the form of a permanent working group composed of representatives of the nature conservation authorities on both sides. This working group performs various informal functions. Its crucial role, however, is to initiate and coordinate transboundary nature conservation and landscape management measures and projects in the border region of the two countries, including species protection measures, landscape management projects, protected area designation and biotope network planning. A special agreement between the *Sächsische Schweiz* National Park authority and the agency administering the Czech landscape reserve of *Labske piskovce* (which is planned to become a National Park) facilitated the development of close and in-depth scientific and organisational cooperation covering the natural area of the *Elbsandsteingebirge*.

Transboundary nature conservation cooperation with Poland is based on a 1994 treaty between the Federal Republic of Germany and the Republic of Poland on cooperation in the field of environmental protection. Collaboration mainly involves the *voivodeships* of Zielona Gora and Jelenia Gora, whose representatives come together in a working group with those of the Saxony State Ministry for the Environment and *Land* Development. The *voivodeships* are also involved to some extent in a WWF project taking place in the border region.

There are currently two individual projects that entail transboundary cooperation:

- the *Zweckverband Naturschutzregion Neisse*, an agency dedicated to nature conservation in the border region of the river Neisse, is performing a project on "Conservation and development of the *Lausitz-Niederschlesischen* pine heaths" (in Lusatia-Lower Silesia). The Saxony State Ministry is providing about DM 77,000 for this project;
- the trilateral transboundary nature protection project in the border region between Germany, Poland and the Czech Republic is aimed at jointly developing measures to protect threatened animal species, especially the otter and white stork. Grants amounting to DM 292,000 from *Land* resources will be made available to the project by the end of 1998.

[Contribution by the Saxony State Ministry for the Environment and *Land* Development]

Otter

Joint nature conservation efforts undertaken by the *Land* of North-Rhine/Westphalia and the Republic of Senegal

Since 1985, 142 nature reserves covering a total area of almost 28,000 ha have been designated under North-Rhine/Westphalia's marshlands programme. However, effective protection for populations of the endangered meadow bird species that nest here can only be achieved by safeguarding their breeding grounds and resting/overwintering centres.

In 1990, the *Land* of North-Rhine/Westphalia agreed to provide financial and technical support to the Republic of Senegal for rehabilitating and improving its 16,000 ha Djoudj National Park. Large stocks of waterfowl and song birds overwinter in this part of the Senegal delta. In recent years, diking and damming measures in the Senegal river have led to far-reaching changes in habitat conditions in the National Park. In order to investigate ways of restoring the site as far as possible to its original state, a wide variety of nature conservation experts from Senegal, Germany and other countries were brought together to develop a biotope management and development plan for the area. Thanks to funding from North-Rhine/Westphalia, a biological field station has been built at the edge of the National Park. It is used both for research activities on the reserve and for the training of rangers from the Republic of Senegal and neighbouring West African countries. The local community are integrated in the implementation of all these measures. It is hoped that with support from the *Gesellschaft für technische Zusammenarbeit* (GTZ) a buffer zone will be established around the National Park in which traditional uses (pastoral farming, fisheries) can be practised, with a view to countering the persistent spread of paddy fields and, in the long run, replacing rice cultivation with this sustainable form of land use.

[Contribution by the North-Rhine/Westphalia Ministry for the Environment, Regional Development and Agriculture]

Cf. the contribution by the *Naturschutzbund Deutschland e.V.* in the Annex,

the contribution by the *Umweltstiftung WWF Deutschland*

the contribution by *Naturschutzbund Deutschland e.V.:*

"International cooperation on the part of environmental associations (examples)",

and the contribution by the *Klima-Bündnis/Alianza del Clima e.V.:" Cooperation between the Climate Alliance and indigenous peoples".*

International cooperation within UNESCO's MAB Programme

The ecosystem programme "Man and the Biosphere" (MAB) was initiated by UNESCO in 1970. Its mission is to develop, at international level, the scientific foundations required for the ecologically sustainable use and conservation of the biosphere's natural resources and to improve these foundations. This demands that human beings and their spatially relevant activities are included in the analysis. Broadening the approach in this way means incorporating not only ecological but also economic, social, cultural, planning and ethical aspects. In view of the potentially global dimension of humankind's interference with the balance of nature, the MAB Programme provided for cooperation on a worldwide scale from the outset.

The activities of the UNESCO Biosphere Reserves in Germany (cf. Chapter 5.3.1) make an important contribution to the international MAB Programme. Here, the aims of the MAB Programme are defined in concrete terms and implemented in exemplary fashion. Via MAB, the Biosphere Reserves in Germany are engaged with the other members of the Global Network of Biosphere Reserves in exchanging their experience of protecting biological diversity and the ecosystem, developing sustainable forms of land use, conducting research, providing environmental education and raising public awareness.

The Biosphere Reserves in Germany have special significance as Ecological Environment Monitoring System sites (cf. Chapter 5.1). This system operates in representative areas and is designed to help record and evaluate changes in the biosphere as early as possible.

A number of important ecosystem research programmes in Germany are recognised as contributing to the MAB Programme. They include centres and long-term programmes for research into forest ecosystems *(Forschungszentrum Waldökosysteme* in Göttingen), lake systems *(Ökosystemforschung Bornhöveder Seenkette* in Schleswig-Holstein), agri-ecological systems *(Forschungsverbund Agrarökosysteme München)* and the Wadden Sea *(Ökosystemforschungsprogramm Wattenmeer)* (cf. Chapter 5.8.2).

Contributions to FAO programmes for the conservation of genetic resources for food, agriculture and forestry

One of the tasks of the FAO is to contribute to the maintenance and sustainable use of genetic resources in the global, regional and national context. This is done by:

- participating in the work of the United Nations Commission for sustainable development (CSD),
- involvement in the activities of other international structures committed to resource protection and in the work of the Secretariat of the Convention on Biological Diversity and the meetings of the parties,
- further development of the Global System for the Conservation and Sustainable Utilisation of Plant Genetic Resources, the key elements of which are a code of conduct on the collection and removal of phytogenetic resources, the creation of an international network of *ex-situ* collections, development of a world information and early-warning system and of the World Action Plan adopted in Leipzig in 1996 and the Report on the State of the World's Plant Genetic Resources presented at that conference,
- discussions to renegotiate the International Commitment on Plant Genetic Resources and to achieve conformity with the Convention on Biological Diversity,
- the activities of the Commission for Genetic Resources for Food and Agriculture, which superseded the Commission on Plant Genetic Resources when its mandate was extended and will in future deal with the whole area of plant and animal genetic resources (including fish), forest genetic resources and micro-organisms for food and agriculture.

Germany supports the FAO's programmes on the conservation of genetic resources for food, agriculture and forestry, in particular the Global Action Plan for the Conservation and Sustainable Use of Plant Genetic Resources for Food and Agriculture, which was unanimously adopted by more than 150 States at the Fourth International Technical Conference of the FAO on phytogenetic resources in Leipzig (June 1996). This plan contains proposals for 20 priority measures in the areas of *in-situ* conservation and development, *ex-situ* conservation, the use of plant genetic resources, capacity building and the creation of institutions. The Member States are in charge of implementation, which is monitored and assisted by the FAO. In principle, a variety of possibilities for funding measures is available through international financing organisations and official bilateral assistance. The role of the GEF and CGIAR in implementing the Global Action Plan is inadequately defined. If possible, these stipulations should be agreed in the course of negotiations on the "International Commitment on Plant Genetic Resources" and in the form of resolutions of the Conferences of the Parties to the Convention on Biological Diversity.

Since forest resources were not, in the end, included in the Global Action Plan for the Conservation and Sustainable Use of Plant Genetic Resources when it was agreed in Leipzig in 1996, Germany is joining with the EU and other States in the FAO Committee on Forests (COFO) in arguing for a World Action Plan for the Conservation and Sustainable Use of Forest Genetic Resources.

In 1990 the FAO Council recommended that an international programme on the sustainable development of animal genetic resources be drawn up. The FAO Committee on Agriculture has been advising the FAO for

several years on the development of a global strategy for the management of genetic resources of farm animals. It is to contain national, regional and global components. The global strategy will be designed to

- define animal-genetic resources,
- measure the genetic variety of animal-genetic resources,
- create a global information and early-warning system, and
- take measures to conserve endangered animal-genetic resources.

In 1995 the FAO published the second edition of the World Watch List for Domestic Animal Diversity. It contains a comprehensive global list of farm animals and some related wild animals. In addition, the global Domestic Animal Diversity System (DAD-IS) has been created on the Internet and offers an overview of the most important measures taken and animal stocks held by the countries involved.

Conservation of forest genetic resources within the scope of the pan-European Ministerial Conference on the Protection of Forests in Europe

Since the tree species of importance to Germany tend to be found across parts of Europe, Germany collaborates closely with the European Forest Genetic Resources Programme (EUFORGEN), which has been in existence since 1994. EUFORGEN has now established networks for "black poplar", "cork oak", "spruce", "valuable broad-leafed trees" and "common broad-leaved trees" (oak, beech). The first three networks should, if possible, also be expanded to include species groups (broad-leaved softwoods, Mediterranean oaks, boreal conifers). The scientists working in the networks are deepening our knowledge of the distribution, biology and genetics of the species and the threat posed to them. The aim is to develop strategies for effective conservation measures and to enable the participants to exchange experience. Although EUFORGEN is a new programme, it has already got off to a promising start.

Contributions to international organisations

The Federal Republic of Germany makes financial contributions to organisations wholly or partly engaged in the conservation and sustainable use of biological resources. The main ones are:

- United Nations Food and Agriculture Organisation (FAO), Rome,
- Office for International Epizootics (OIE), Paris,

Black poplar

- International Council for the Exploration of the Sea (ICES), Copenhagen
- International Council for Game and Wildlife Conservation (CIC), Paris,
- European and Mediterranean Plant Protection Organisation (EPPO), Paris,
- International Commission on Irrigation and Drainage (ICID), New Delhi,
- International Union for the Protection of New Plant Varieties (UPOV), Geneva,
- Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), Hobart,
- International Whaling Commission (IWC), Cambridge,
- International Plant Genetic Resources Institute (IPGRI), Rome.

Subscriptions paid to the aforementioned organisations in 1997 are expected to have amounted to about DM 46 million.

In recent years Germany has paid on average the equivalent of more than US$ 500,000 per annum to the Secretariat of the Convention on Biological Diversity. An additional voluntary payment was also made of US$ 100,000 per annum.

The transfer of technology between Germany and the other Parties to the Convention on Biological Diversity is facilitated by the Clearing-House Mechanism, now being set up, and by the International Transfer Centre for Environmental Technology *(Internationale Transferzentrum für Umwelttechnologie;* ITUT.

German Clearing-House Mechanism

Article 18 (3) of the Convention on Biological Diversity calls for the establishment of a "clearing-house mechanism" (CHM) as an information hub or liaison mechanism to promote technical and scientific cooperation between the Parties and to facilitate the exchange of experience gained in implementing the objectives.

Since 1 November 1995, the Information Centre for Genetic Resources *(Informationszentrum genetische Ressourcen;* IGR) at the Central Office for Agricultural Documentation and Information *(Zentralstelle für Agrardokumentation und -information;* ZADI) has been developing the informational dimension of the German contribution to the international CHM as part of a project funded by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) and supported by the Federal Office for Nature Conservation (BfN). The project is initially due to run until the end of 1998. As part of the project, an information structure was set up on the World Wide Web in the Internet from which various information sources are accessible. The development of the information services in the German CHM is supported by a mixed working party consisting of representatives from governmental agencies, nongovernmental organisations from the environmental and development cooperation sector, scientific institutions and the private sector.

In May 1995 and June 1997, Germany organised two highly regarded international workshops on the subject of CHMs, thus putting itself at the forefront in the development of these mechanisms.

The German Clearing-house Mechanism can be accessed in the World Wide Web/Internet at the following address: http://www.dainet.de/bmu-cbd/homepage.htm.

[Contribution by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety]

The CHM constitutes an important component in the "Global Information Infrastructure", an initiative launched in 1995 by the seven leading industrial nations (G7), which includes experimenting with the use of international data networks for transferring science and technology and for creating global "virtual libraries".

Germany chairs a working group concerned specifically with information on biological diversity.

International Transfer Centre for Environmental Technology (ITUT)

The Convention on Biological Diversity contains an obligation to facilitate access to and transfer of technologies required for the conservation of biological diversity. This means that the industrialised countries have an obligation to promote the transfer of technology to developing countries via the private sector.

German companies in the environmental protection sector have broad and varied experience in the development, production and transfer of environmental technology and environmental know-how that can be very useful in the conservation and sustainable use of biological diversity. Since private businesses make their own decisions on how active they wish to become in the developing countries, the policy-makers' task is to create a favourable framework for the transfer of environmental technology. Founded in 1996 in Leipzig on the initiative of politicians, businessmen and scientists, the International Transfer Centre for Environmental Technology *(Internationales Transferzentrum für Umwelttechnologie;* ITUT) contributes to the establishment of this framework.

ITUT endeavours to serve as a platform from which government and the science and business communities - working jointly with the relevant institutions in partner countries - can make a practical contribution towards global processes of sustainable development. It is assisted by two independent institutions operating under its umbrella, ITUT GmbH and the ITUT Association *(ITUT Verein)*, which pursue mutually complementary objectives.

The aim of the ITUT Association is the transfer of environmental protection know-how as a contribution to solving regional and global environmental and development problems in the partner countries, raising environmental awareness and harmonising legislation and environmental standards worldwide.

The primary aim of ITUT GmbH is to ensure that the range of products and services offered by German environmental protection companies have sufficient presence and establish a network linking

supply and demand on the international environmental protection market. To this end, ITUT *GmbH* liaises closely with ten Environment Area Managers working from the Chambers of Foreign Trade in selected partner countries. At present, Environment Area Managers are operating in Brazil/Sao Paulo, China/Shanghai, India/Bombay, Indonesia/Jakarta, Malaysia/Kuala Lumpur, Thailand/Bangkok, the Czech Republic/Prague, Hungary/Budapest, Poland/Warsaw and Mexico/Mexico City.

ITUT's activities are chiefly financed on a project-by-project basis, such as the programme to develop an information network between the partner countries and German companies producing environmental technology. Since ITUT is a member of the working group designing the German Clearing-House Mechanism (see above), it plays a direct and active part in the implementation of the Convention on Biological Diversity.

Capacity building at ITUT is assisted by the environmental foundation *Deutsche Bundesstiftung Umwelt* (DBU), the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety and the Land government of the Free State of Saxony. For the posts of Environment Area Manager at the Chambers of Foreign Trade, funding is provided by the Federal Economics Ministry.

ITUT can be contacted at:
ITUT
Business Park Leipzig,
Maximilianallee 1a,
04129 Leipzig,
Fax: +49-(0)341-6096-751
[Contribution by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety]

Access to genetic resources

There is little experience anywhere in the world of regulating access to genetic resources (Article 15, CBD). Germany is endeavouring to help clarify the complicated legal issues involved. In mid-1995, an initial expertise covering certain segments was commissioned to facilitate the implementation of Articles 15 and 16, and its findings are being evaluated. As a parallel measure to the preparation of legal expertises, a working group on "access to genetic resources" was set up to discuss the problems that occur in practice. Governmental and non-governmental institutions and organisations, including private-sector representatives, are represented in this working group. Initial experience of cooperation in this field was discussed at an international workshop hosted by Germany in August 1996.

Cf. the contribution by the *Verband Forschender Arzneimittelhersteller* (VFA) *e.V.* in the Annex: "Initiatives of the *Verband Forschender Arzneimittelhersteller* (VFA)".

Protocol on biological safety

Meeting in Jakarta in November 1995, the Second Conference of the Parties to the Convention on Biological Diversity appointed a working party to prepare a protocol on biological safety pursuant to Article 19 (3) of the Convention, with the task of "specifically focusing on transboundary movement" of living modified organisms. This working party is due to complete its work in 1998.

The future shape of a protocol, particularly its scope and the procedures provided for, was still not clear after the third session of the working party, which took place in October 1997 in Montreal. A whole number of important questions are still the subject of debate both within the EU and at national level. The next session of the working party will take place in February 1998. It is then intended to consider, through political negotiations, the various options submitted for the legal texts and gradually move towards a concrete formulation of the future text of the protocol.

Tourism

Shortly before the International Tourism Exchange in Berlin in March 1997, a conference was hosted by the Federal Environment Minister to discuss the subject of "Biological Diversity and Sustainable Tourism". The conference was attended by the environment ministers of 18 countries, representatives of the EU Commission, UNEP, GEF, the Secretariat of the Convention on Biological Diversity, the World Tourism Organisation, the IUCN and German tourism association and environment organisations *(Deutscher Fremdenverkehrsverband, Deutscher Naturschutzring, Deutscher Reisebüroverband, Forum Umwelt und Entwicklung)* and produced the "Berlin Declaration". It represents an initial global consensus on the principles of sustainable tourism that is compatible with nature and the environment. It primarily states that:

- sustainable tourism is a sensible way of using biological diversity and can contribute to its conservation;
- the development of tourism needs to be controlled and carefully managed to ensure that it takes a sustainable course;
- particular attention must be paid to tourism in ecologically and culturally sensitive regions, where mass tourism is to be avoided;
- responsibility for developing sustainable tourism lies with all the actors, especially the private sector, and voluntary initiatives (codes of conduct, quality labels) should be encouraged;
- great importance is attached to the local level, which not only has a responsibility for developing sustainable tourism but should also derive particular benefit from tourism.

On the one hand, the Berlin Declaration is to be implemented via the Conference of the Parties to the Convention on Biological Diversity with the aim of concluding global arrangements for developing sustainable tourism. It is expected that an initial resolution on this will be adopted at the Fourth Conference of the Parties in May 1998 in Bratislava (Slovakia). On the other hand, it forms a basis for activities under the auspices of the UN Commission for Sustainable Development (CSD). Thus, the special session of the UN General Assembly on Environment and Development in June 1997 already commissioned the CSD to submit a work programme on "sustainable tourism" by 1999. In addition, bilateral and multilateral financing institutions are called upon to integrate the principles contained in the Berlin Declaration in their tourism-related funding policies.

As part of its educational work in the development policy field, the Federal Ministry for Economic Cooperation and Development (BMZ) has produced information material targeted specifically at German tourists travelling abroad, which puts the case for socially and ecologically compatible tourism.

6. Financing

This chapter provides a brief overview of funding for individual measures referred to in Chapter 5 that serve to implement the Convention.

Conversion factor: US$ 1.00 = DM 1.80

Measures serving to implement the Convention are financed from a wide range of sources, although the production of the National Report itself incurs no additional costs for the Federal Government *Länder* or local authorities. It is not possible to give a detailed and exhaustive statement of allocations or an estimate of total expenditure. The following table therefore presents only part of the costs incurred.

It should be noted that the list also includes measures in which the conservation and sustainable use of biological diversity is not the main goal but one of several.

Table 4

Existing programmes and measures serving inter alia to implement the objectives of the Convention on Biological Diversity (selection compiled from various sources)

Type of funds	Period	Volume of funding
Federal and Länder programmes assisted by EC grants		
16 projects in Germany assisted by the EC financing instrument LIFE	1991 - 1995	total DM 79.8 mill., including EC grant of DM 44.5 mill.
13 projects in Germany assisted by the EC financing instrument LIFE	1996 - 1997	total DM 26.99 mill., including EC grant of DM 11.98 mill.
Agri-environmental programmes on the basis of EC Regulation 2078/92 to promote environmentally sound production methods	1993 - 1996	total DM 3,082 mill., including EC grant of DM 1,682 mill.
Implementation of EC Regulation 2078/92 in the Joint Federal/Länder Task of Improving Agricultural Structures and Coastal Defences	1997	135 mill. (Federal and *Länder* funds)
Federal Government expenditure on "establishing and safeguarding valuable parts of nature and the countryside that are of representative significance for the nation as a whole"	1997	41.5 mill.
Total Federal expenditure on environmental research: relevant areas of ecological research (including some of the items below)	annual	currently at approx. DM 450 mill.
Project funding: BML grants for research and development projects in the agricultural sector for environmental protection, including conservation and development of natural resources	1997	DM 4 mill.

Type of funds	Period	Volume of funding
BML funding for the conservation of biological diversity, genetic resources, biotechnology and renewable raw materials	annual	> DM 100 mill.
Project funding: ecological research by the BMBF	annual	approx. DM 80 mill.
Project funding: nature conservation research by the BMU	1997	DM 9.7 mill.
BMU grants for testing and development projects in the field of nature conservation	1997	DM 10.9 mill.
Overall state expenditure on the promotion of biotechnology research	annual	> DM 1,000 mill. (of which BMBF: > DM 900 mill.)
Bilateral projects in the field of technical and financial development cooperation serving to implement the Convention on Biological Diversity in the spheres of nature conservation, forestry, agriculture and fisheries, see list of projects in annex	since 1992	approx. DM 1.5 billion
Germany's contributions to GEF	1995 - 1997	approx. DM 390 mill.
BMZ support for projects by international nature conservation organisations (WWF, IUCN, WRI, IIED)	annual	approx. DM 6 mill.
Debt relief measures for the benefit of tropical forest protection and nature conservation	1993 - 1995 1996	equivalent to approx. DM 240 mill. equivalent to approx. DM 200 mill.
German contribution to the CGIAR	annual	approx. DM 35 mill.
BML contributions to international organisations concerned with the conservation and sustainable use of biological resources (FAO, OIE, ICES, CIC, EPPO, ICID, UPOV, CCAMLR, IWC, IPGRI)	1997	estimated at approx. DM 46 mill.
BML contribution to the staging of the 4th Technical FAO Conference on Plant Genetic Resources, Leipzig 1996	over several years	totalling approx. DM 3.8 mill.
Contribution to the Secretariat of the Convention of Biological Diversity	annual	approx. US $ 500,000 + additional voluntary contribution of DM 100,000
Creation of the German contribution to the Clearing-House mechanism	1995 - 1998	approx. DM 470,000

7. Analysing the effectiveness of measures to implement the Convention

This chapter discusses some of the instruments to be used for analysing the progress made in implementing the Convention and for monitoring changes in the economy, the environment and society.

Indicator systems

Agenda 21 calls explicitly (in Chapter 40) for the development and use of parameters or assessment criteria that can be applied at national and international level to measure the extent to which development processes conform to the objective of sustainable development. These indicators of sustainable development should enable us to identify the general trends shaping a country's core problem areas, wherever possible on the basis of data collated in time series. In this sense, indicators also serve as an instrument for putting the concept of sustainability on a more concrete footing, for setting priorities and for improving public information and communication. It is hoped that, by carefully selecting parameters from the mass of individual data, sustainability indicators can be employed to systematically reduce complexity and to provide a readily comprehensible picture of the true situation. This demands a pragmatic approach.

On the one hand, indicator systems must be able to reflect the specific set of problems facing a country or region, while on the other there is a need for maximum international harmonisation. Many international institutions have addressed the issue of indicators (for example OECD, UNEP, WRI, World Bank, SCOPE) and, using various methods, they are attempting to tackle the challenge of information selection. Most of the work done so far is, however, limited to individual aspects of the sustainability debate. The OECD, for example, has performed important work on environmental indicators, which many countries have adopted as a model for their own set of national environmental indicators.

At its Third Session in 1995 the United Nations Commission on Sustainable Development (CSD) agreed on a work programme on sustainable development indicators that will run until the year 2000. The indicators should serve as a tool for monitoring progress towards sustainable development or the implementation of Agenda 21 at national level. An important component of the work programme is the testing phase in which the CSD's indicator concept (including a working list of indicators for the chapters of Agenda 21) is to undergo trials until the end of 1999, carried out on a voluntary basis by a number of countries. The aim of this testing phase is to examine how far the CSD indicator system can be implemented in practice, how relevant it is to policy-making and whether it enables informative conclusions to be drawn. Testing is also aimed at developing ideas for improvements. The Federal Government has declared that it is willing to participate in the testing phase of the CSD indicators.

The CSD working list is subdivided into the categories of "social affairs", "economic affairs", "environment" and "institutions". The category of "environment" addresses *inter alia* the field of "biological diversity", for which individual indicators are proposed.

The individual "biological diversity" indicators that are proposed in the CSD working list may be too general to be suitable for analysing the effectiveness of measures to implement the Convention on Biological Diversity. The intensive efforts already underway to formulate, specify and examine possible indicators for biological diversity at international level are extremely important. It is particularly vital that procedures be harmonised and data collated using indicators developed within the scope of the Convention on Biological Diversity.

Aspects of biological variety are also registered by forest indicator systems, inputs of the forest sector to Environmental Economic Accounts (see below) and other forestry monitoring instruments (for example, European Indicators, Federal Forest Inventory). Since the autumn of 1997, Germany has been involved in a European project (EU: FAIR) to find a consensus on indicators and their application in the field of "sustainable use of forests". This work, which is part of the Helsinki process (cf. Chapters 2.1 and 3.4), takes account inter alia of biological diversity in forests.

Integrated Environmental and Economic Accounting

The development of indicators to record the state of the environment, including the state of components of biological diversity, is an important field in the context of compiling the Integrated Environmental and Economic Accounts *(Umweltökonomische Gesamtrechnun-*

gen; UGR) that are being produced and progressively refined by the Federal Statistical Office *(Statistisches Bundesamt)*.

As an **independent comprehensive statistical system,** the Integrated Environmental and Economic Accounts (UGR) provide a necessary complement to the traditional macro-economic National Accounts by adequately expressing the costs of economic activities in terms of their use of natural resources and impact on the environment. The original aim of developing a single, highly aggregated indicator that is capable of reflecting the general economic and ecological trend has, however, turned out to be impracticable. This is due to the complexity of ecological and economic relationships, inadequate knowledge of causal mechanisms, methodological problems of selecting and weighting and the (monetary) valuation of environmental changes for which no generally accepted valuation principles yet exist.

In the indicator system, the quality of the environment, i.e. of ecosystems, is examined from three different aspects:

- structural changes in ecosystems and landscapes,
- changes/impairment through pollution burdens (especially on soil, water, organisms and atmosphere)
- the functioning of ecosystems and landscapes.

Targets for environmental quality / environmental action

The assessment of sustainability is also served by the scientifically sound formulation of environmental quality targets (desired state of the environment) from which environmental action goals (necessary steps to achieve the state defined in the environmental quality targets) can be derived. These goals provide benchmarks against which to measure progress towards sustainable development. This model, which was developed by the Federal Environment Agency *(Umweltbundesamt)*, is currently being refined at the Federal Office for Nature Conservation *(Bundesamt für Naturschutz)* and extended to include components of biological diversity.

Ecologically oriented company management / corporate environmental management systems

Corporate environmental management systems are steadily gaining in importance as central instruments in an ecologically oriented form of company management founded on responsible and creative action by employers and staff. Practising ecologically oriented company management in a way that can systematically integrate environmental protection into all spheres of company activity is crucial to modern, production-integrated and product-integrated environmental protection and thus to sustainable economic activity. Moreover, an efficient environmental management system generates a whole number of economic benefits.

Eco-Management and Audit Scheme (EMAS) and ISO 14001

Alongside environmental management systems designed by companies themselves, two "formalised" environmental management systems are predominantly in use in Germany and the rest of Europe:

- the environmental management system based on the EC Eco-Audit Regulation (Eco-Management and Audit Scheme; EMAS);
- the environmental management system based on international standard ISO 14001, which was adopted unchanged as the European standard EN ISO 14001 and as the German standard DIN EN ISO 14001.

The EC Eco-Audit Regulation is designed to promote the development of environmental management systems aimed at continual improvement in a company's environmental protection performance at its particular location and to an extent that even exceeds statutory environmental requirements for the site. The companies themselves define the environmental protection goals and measures needed to achieve them. These are brought together to form an integrated company environmental policy, which is formulated in an environmental programme and documented in an environmental statement for the public. With regard to the amendment of the EC Eco-Audit Regulation, the most important aspect will be to find ways of improving the ecological effectiveness of this instrument by developing the system further.

The international standard ISO 14001 (Environmental Management Systems - Specification with guidance for use) differs from EMAS in several fundamental aspects. Firstly, it would appear to be easier for companies to apply ISO 14001, since it is more clearly formulated and structured and, moreover, the requirements to be fulfilled are less demanding than those of EMAS (for example, it is

not necessary to examine the entire site or to publish an environmental statement). A further difference between ISO 14001 and EMAS (of particular importance to companies operating internationally) is that an ISO certificate is valid world-wide, whilst participation in EMAS is limited to the EU. From an environmental policy perspective, the decisive difference lies, however, in the fact that the process of continual improvement required by ISO 14001 refers only to the environmental management system itself and not, as in the case of EMAS, to actual environmental performance.

[Contribution by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety]

By establishing a corporate environmental management system, companies and, in some cases, public authorities are able to take greater account of the impact of their own activities on the environment and thus on biological diversity. However, there are still certain methodological difficulties. Whereas end-of-the-pipe pollution is fairly easy to record, assessing how inputs into the environment then affect the ecosystems surrounding a company's site still represents a relatively serious problem, i.e. when this assessment is to be carried out by the company itself as part of its environmental management policy. This problem applies particularly to assessing the status of components of biological diversity, which is often even more difficult to record and thus to take into account than quality parameters relating to the inanimate parts of the environment.

Through their research activities, the Federal Environment Ministry and the Federal Environmental Agency will continue to study the question of how environmental management can better assess the environmental impact of company activities. In addition, non-governmental organisations are also active in the field of ecologically oriented company management, such as the International Network for Environmental Management (INEM), the *Bundesdeutscher Arbeitskreis für Umweltbewußtes Management e.V.* (B.A.U.M.) or the environmental initiative of *Unternehme(r)n future e.V.*.

Cf. the contribution by the *Bundesdeutscher Arbeitskreis für Umweltbewußtes Management e.V.* (B.A.U.M.) in the Annex.

Glossary of terms

Terms as defined in the Convention of Biological Diversity

The following terms, presented here in alphabetical order, are - unless otherwise stated - used in the above document in accordance with definition of terms given in Article 2 of the Convention on Biological Diversity.

Biological diversity: the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.

Biological resources: includes genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems with actual or potential use or value for humanity.

Biotechnology: any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use.

Country of origin of genetic resources: the country which possesses those genetic resources in in-situ conditions.

Country providing genetic resources: the country supplying genetic resources collected from in-situ sources, including populations of both wild and domesticated species, or taken from ex-situ sources, which may or may not have originated in that country.

Domesticated or cultivated species: species in which the evolutionary process has been influenced by humans to meet their needs.

Ecosystem: a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

Ex-situ conservation: the conservation of components of biological diversity outside their natural habitats.

Genetic material: any material of plant, animal, microbial or other origin containing functional units of heredity.

Genetic resources: genetic material of actual or potential value.

Habitat: the place or type of site where an organism or population naturally occurs.

In-situ conditions: conditions where genetic resources exist within ecosystems and natural habitats, and, in the case of domesticated or cultivated species, in the surroundings where they have developed their distinctive properties.

In-situ conservation: the conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings and, in the case of domesticated or cultivated species, in the surroundings where they have developed their distinctive properties.

Protected area: a geographically defined area which is designated or regulated and managed to achieve specific conservation objectives.

Sustainable use: the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations.

Technology: includes biotechnology.

Other definitions

Agenda 21: one of the documents adopted at the UNCED (Rio 1992); detailed collection of directions on how the Rio Conventions (Framework Convention on Climate Change and Convention on Biological Diversity) are to be implemented; not, however, legally binding; serves as a model for developing "Local Agendas 21".

autochthonous: native to the place in question.

azonal: applied to life conditions or vegetation that establish themselves in roughly the same form in several zones with different types of general climate because they are conditioned by the same extreme soil factors; example: alluvial forests.

biotope type: characteristic type abstracted from the totality of similar biotopes; the ecological conditions it offers provide a largely uniform set of requirements for life communities that is distinct from other biotope types.

biotope: habitat of a recurrent life community.

Council of Europe: an association of European States, founded in 1949; it has a far larger membership than the EU.

CSD: a United Nations commission set up in response to an UNCED (Rio 1992) resolution on support for the Rio follow-up process.

Deutsche Bundesstiftung Umwelt (DBU): founded in 1990 on the basis of privatisation revenues, it is the largest private agency in Europe for promoting environmental protection. With an annual budget of DM 140 million, it has awarded grants totalling DM 570 million since its foundation; annually awards the German Environment Prize (DM 1 million, Europe's most valuable environmental prize).

EC Regulation 2078/92: issued as part of the 1992 reform of the EC's Common Agricultural Policy, the "Regulation on agricultural production methods compatible with the requirements of the protection of the environment and the maintenance of the countryside" obliges EU Member States to offer farmers assistance programmes for environmentally sound agricultural production methods conserving the natural habitat.

endemic, endemite: a plant or animal species confined to a limited geographical region.

European Community (EC): supranational organisation vested with sovereign powers, consisting of 15 States in western Europe.

European Union (EU): goal pursued by the EC Member States in their efforts to achieve closer integration; rests on the three pillars of the economic community of the EC States, cooperation on EC justice and home affairs and the common foreign and security policy. Unlike the EC, the EU is not (yet) vested with sovereign powers.

eutrophication: enrichment with plant nutrients.

extrazonal: refers to life conditions or vegetation that establish themselves when local circumstances alter the influence of the general climate, thus allowing forms of vegetation to occur that are zonal in other regions, i.e may be seen in those regions as an expression of general climate; example: occurrence of subarctic (nordic) plants in mountainous areas of Central Europe.

FAIR: Fisheries, Agriculture and Industrial Research; an EU research programme for these sectors.

Forum Umwelt und Entwicklung: Environment and Development Forum bringing together German organisations and associations from the sphere of environmental protection, nature conservation and development in order to support the Rio follow-up process.

Framework Convention on Climate Change: one of the binding international treaties signed at UNCED in 1992: its aim is to stabilise the concentration of greenhouse gases in the atmosphere at a level that will prevent any dangerous imbalance in the climate system.

integrated plant protection: combination of methods whereby priority is given to the use of biological, biotechnological and plant-breeding methods as well as planting and cultivation techniques, thus keeping chemical plant protection agents a bare minimum.

LIFE: EC financing instrument, in existence since 1992, for pilot projects concerned with the environment, nature and third countries; total volume approximately DM 450 mill. (spread over three years). In its "Nature" section, grants are awarded for measures implementing the EC Bird Directive and the EC Habitat Directive.

Local Agendas 21: initiatives to implement the recommendations for action set out in Agenda 21 (Rio 1992) by means of programmes of action at local (or local authority) level.

Natura 2000: network of protected areas within the EU to be established on the basis of EC nature conservation directives.

neophytes/neozoa: plant and animal species that, by human agency, have been introduced into a particular region at some time since the mid-16th century and which either disappear after a certain period or establish themselves permanently (living wild or later becoming wild).

OECD: organisation of major nations in Europe and North America as well as Japan, Australia and New Zealand for the coordination of economic policy.

population: a self-sustaining community of wild animals or plants of a particular species within a certain geographical region.

potential natural vegetation: the vegetation that, but for human interference, would establish itself under present environmental conditions; in determining what this vegetation would be, not only is the actual vegetation considered but also climate and soil conditions.

Red Lists: catalogue of plant and animal species that are extinct, no longer sighted or considered endangered; compiled in accordance with verifiable criteria and compared with the situation at a particular point in history (e.g. 1850, prior to industrialisation).

UNCED: United Nations Conference on Environment and Development, Rio de Janeiro, 1992; the confer-

ence produced two treaties that are binding under international law (the Framework Convention on Climate Change and the Convention on Biological Diversity) and three non-binding documents (Rio Declaration, Statement of Forest Principles and Agenda 21).

Bibliography

This selection contains the most important sources used for this report.

Publications fron Federal authorities

BUNDESAMT FÜR NATURSCHUTZ (1995): *Materialien zur Situation der biologischen Vielfalt in Deutschland. Landwirtschaftsverlag,* Münster, pp. 112

Appeared simultaneously in English as: Materials on the Situation of Biodiversity in Germany.

BUNDEAMT FÜR NATURSCHUTZ (ed.) (1996): *Daten zur Natur*, Landwirtschaftsverlag, Münster, pp. 170

BUNDESAMT FÜR NATURSCHUTZ (ed.) (1997): *Biodiversität und Tourismus, Konflikte und Lösungsansätze an den Küsten der Weltmeere, Springer Verlag,* Heidelberg, Berlin, pp. 365

BUNDEAMT FÜR NATURSCHUTZ (ed.) (1997, in preparation): *Erhaltung der biologischen Vielfalt. Wissenschaftliche Analyse deutscher Beiträge. Landwirtschaftsverlag, Münster*.

BUNDESMINISTERIUM FÜR BILDUNG, WISSENSCHAFT, FORSCHUNG UND TECHNOLOGIE (1996): *Bundesbericht Forschung. Bonner Universitäts-Buchdruckerei*, Bonn, pp. 676

BUNDESMINISTERIUM FÜR ERNÄHRUNG, LANDWIRTSCHAFT UND FORSTEN (no year specified): *Waldzustandsbericht der Bundesregierung. Ergebnisse der Waldschadenserhebung.* Bonn (new edition published every year)

BUNDESMINISTERIUM FÜR ERNÄHRUNG, LANDWIRTSCHAFT UND FORSTEN (no year specified): *Bundeswaldinventur 1986 - 1990. Eine Wertung.* pp. 30, Bonn.

BUNDESMINISTERIUM FÜR ERNÄHRUNG, LANDWIRTSCHAFT UND FORSTEN (1994): *Der Wald in den neuen Bundesländern.* pp. 20, Bonn.

BUNDESMINISTERIUM FÜR ERNÄHRUNG, LANDWIRTSCHAFT UND FORSTEN (1994): *Nationaler Waldbericht der Bundesrepublik Deutschland.* Bonn.

BUNDESMINISTERIUM FÜR ERNÄHRUNG, LANDWIRTSCHAFT UND FORSTEN (ed.) (1995): *Dauerbeobachtungsflächen zur Umweltkontrolle im Wald. Deutscher Beitrag zum europäischen Waldschadensmonitoring (Level II-Programm).* Bonn.

BUNDESMINISTERIUM FÜR ERNÄHRUNG, LANDWIRTSCHAFT UND FORSTEN (1996): *Nutzpflanzen: Vielfalt für die Zukunft. Bericht über die Erhaltung und nachhaltige Nutzung pflanzengenetischer Ressourcen. Deutscher Bericht zur Vorbereitung der 4. Internationalen Technischen Konferenz der FAO über pflanzengenetische Ressourcen von 17. - 23. Juni 1996 in Leipzig*. pp. 178 Bonn.

BUNDESMINISTERIUM FÜR ERNÄHRUNG, LANDWIRTSCHAFT UND FORSTEN (1996): Plant Genetic Resources for Food and Agriculture. German National Report. pp. 167 Bonn.

BUNDESMINISTERIUM FÜR ERNÄHRUNG, LANDWIRTSCHAFT UND FORSTEN (1996): *Genetische Vielfalt der Nutzpflanzen in Deutschland. Wichtige Ressource für unsere Land- und Forstwirtschaft.* pp. 67 Bonn.

BUNDESMINISTERIUM FÜR ERNÄHRUNG, LANDWIRTSCHAFT UND FORSTEN (1996): J*ahresbericht über die deutsche Fischereiwirtschaft.* Bonn

BUNDESMINISTERIUMFÜR ERNÄHRUNG, LANDWIRTSCHAFT UND FORSTEN (1996): *Für eine nachhaltige und leistungsfähige Forstwirtschaft. Forstpolitisches Konzept von Bundesminister Jochen Borchert.* pp. 24 Bonn.

BUNDESMINISTERIUM ERNÄHRUNG, LANDWIRTSCHAFT UND FORSTEN (1997): *Zusammenstellung über zugelassenes Ausgangsmaterial für forstliches Vermehrungsgut in der Bundesrepublik Deutschland. Stand 1. Oktober 1997*. Bonn.

BUNDESMINISTERIUM FÜR ERNÄHRUNG, LANDWIRTSCHAFT UND FORSTEN (ed.) (1997): *Deutscher Waldbodenbericht 1996.* Bonn.

BUNDESMINISTERIUM FÜR ERNÄHRUNG, LANDWIRTSCHAFT UND FORSTEN (1997): *Waldbericht der Bundesregierung.* pp. 54 Bonn.

BUNDESMINISTERIUM FÜR ERNÄHRUNG, LANDWIRTSCHAFT UND FORSTEN (1997): *Agrarbericht der Bundesregierung. Bonner Universitäts-Buchdruckerei,* pp. 155+236 Bonn.

BUNDESMINISTERIUM FÜR ERNÄHRUNG, LANDWIRTSCHAFT UND FORSTEN (1997): *5. Tropenwaldbericht der Bundesregierung*. Bonn.

BUNDESMINISTERIUM FÜR ERNÄHRUNG, LANDWIRTSCHAFT UND FORSTEN (1997): *4. Internationale Techni-*

sche Konfenrenz der FAO über Pflanzengenetische Ressourcen. Schriften zu Genetischen Ressourcen, Sonderband. pp. 188 Bonn.

BUNDESMINISTERIUM FÜR ERNÄHRUNG, LANDWIRTSCHAFT UND FORSTEN (1997, in preparation): *Biologische Vielfalt in Ökosystemen. Reihe A. Angewandte Wissenschaft. Landwirtschaftsverlag,* Münster-Holtrup.

BUNDESMINISTERIUM FÜR RAUMORDNUNG, BAUWESEN UND STÄDTEBAU (ed.)(1996): *Siedlungsentwicklung und Siedlungspolitik. Nationalbericht Deutschland zur Konferenz HABITAT II*. Bonn

BUNDESMINISTERIUM FÜR RAUMORDNUNG, BAUWESEN UND STÄDTEBAU (ed.)(1996): *Nationaler Aktionsplan zur nachhaltigen Siedlungsentwicklung. Nationalbericht Deutschland zur Konferenz HABITAT II*. Bonn

BUNDESMINISTERIUM FÜR RAUMORDNUNG, BAUWESEN UND STÄDTEBAU: *Raumordnungsbericht 1993*. Bonn

BUNDESMINISTERIUM FÜR UMWELT, NATURSCHUTZ UND REAKTORSICHERHEIT (1994): *Erster Bericht der Regierung der Bundesrepublik Deutschland nach dem Rahmenübereinkommen der Vereinten Nationen über Klimaänderungen*. Bonn.

BUNDESMINISTERIUM FÜR UMWELT, NATURSCHUTZ UND REAKTORSICHERHEIT (1997): *Zweiter Bericht der Regierung der Bundesrepublik Deutschland nach dem Rahmenübereinkommen der Vereinten Nationen über Klimaänderungen*. Bonn.

BUNDESMINISTERIUM FÜR UMWELT, NATURSCHUTZ UND REAKTORSICHERHEIT (1995): *Umweltpolitik - Schutz und nachhaltige Nutzung der Natur in Deutschland. Bericht der Bundesregierung zur Umsetzung des Übereinkommens über die biologische Vielfalt in der Bundesrepublik Deutschland. September 1995. BT-Drs.*

Appeared simultaneously in English under the title: Report of the Federal Government on the Implementation of the Convention on Biological Diversity in the Federal Republic of Germany.

BUNDESMINISTERIUM FÜR UMWELT, NATURSCHUTZ UND REAKTORSICHERHEIT (1997): *Auf dem Weg zu einer nachhaltigen Entwicklung in Deutschland. Bericht der Bundesregierung anläßlich der VN-Sondergeneralversammlung über Umwelt und Entwicklung 1997 in New York. Bundestags-Drucksache 13/7054 vom 21.02.1997.*

Appeared simultaneously in English as: Towards Sustainable Development in Germany.

BUNDESMINISTERIUM FÜR UMWELT, NATURSCHUTZ UND REAKTORSICHERHEIT (1997): *Schritte zu einer nachhaltigen, umweltgerechten Entwicklung. Berichte der Arbeitskreise anläßlich der Zwischenbilanzveranstaltung am 13. Juni 1997. Bonner Universitäts-Buchdruckerei.* Bonn, pp. 126

BUNDESMINISTERIUM FÜR WIRTSCHAFTLICHE ZUSAMMENARBEIT UND ENTWICKLUNG/DEUTSCHE GESELLSCHAFT FÜR TECHNISCHE ZUSAMMENARBEIT (1996): Biodiversity Conservation in German Development Cooperation. pp. 65

BUNDESREGIERUNG (1995): *Unterrichtung der deutschen Bundesregierung an den Bundesrat (BR-Drs. 438/95 v. 13.07.1995). Mitteilung der Kommission der Europäischen Gemeinschaften an den Rat, das Europäische Parlament und den Ausschuß der Regionen über die sinnvolle Nutzung und Erhaltung von Feuchtgebieten. KOM (95) 189 ENDG, Ratsdokument 8564/95*

BUND-LÄNDER ARBEITSGRUPPE "ERHALTUNG FORSTLICHER GENRESSOURCEN": *Konzept und Jahresbericht*

DEUTSCHER BUNDESRAT (1985): *Entschließung des Bundesrates über Maßnahmen zur Erhaltung der genetischen Vielfalt der Waldbaumarten vom 8. Februar 1985. Bundesratsdrucksache 573/84.*

UMWELTBUNDESAMT (ed.) (1997) : *Daten zur Umwelt - Der Zustand der Umwelt in Deutschland. Erich-Schmidt-Verlag,* Berlin, pp. 570

UMWELTBUNDESAMT (ed.) (1997): *Nachhaltiges Deutschland. Wege zu einer dauerhaften umweltgerechten Entwicklung. Erich-Schmidt-Verlag,* Berlin, pp. 355

Further publications

CONFERENCE MINISTERIELLE (1990): *Conférence Ministerielle pour la Protection des Forêts en Europe. Actes de la Conférence*, pp. 225

COUNCIL OF EUROPE; UNEP; EUROPEAN CENTRE FOR NATURE CONSERVATION (1996): The Pan-European Biological and Landscape Diversity Strategy. Mart. Spruijt, Amsterdam, pp. 50

FAO (1997): State of the World's Forest. pp. 200 Rome

FAO (1996): Report on the State of the World's Plant Genetic Ressources for Food and Agriculture. pp. 75, Rome.

FAO (1996): Global Plan of Action for the Conservation and Sustainable Utilisation of Plant Genetic Re-

sources for Food and Agriculture and the Leipzig Declaration. pp. 63. Rome.

MINISTERIAL CONFERENCE ON THE PROTECTION OF FORESTS IN EUROPE (1995): Interim Report on the Follow-up of the Second Ministerial Conference. Helsinki: Ministry of Agriculture and Forestry.

MINISTRY OF AGRICULTURE AND FORESTRY (1993): Ministerial Conference on the Protection of Forests in Europe, 16-17 June 1993 in Helsinki. Conference Proceedings. pp. 186. Helsinki: Ministry of Agriculture and Forestry.

Abbreviations

List of the abbreviations used in the report (except in textboxes)

BAZ	Bundesanstalt für Züchtungsforschung an Kulturpflanzen
BfN	Bundesamt für Naturschutz (Federal Office for Nature Conservation)
BMBau	Bundesministerium für Raumordnung, Bauwesen und Städtebau (Federal Ministry for Regional Planning, Building and Urban Development
BMBF	Bundesministerium für Bildung, Wissenschaft, Forschung und Technologie (Federal Ministry of Education, Science, Research and Technology)
BMG	Bundesministerium für Gesundheit (Federal Ministry of Health)
BML	Bundesministerium für Ernährung, Landwirtschaft und Forsten (Federal Ministry of Food, Agriculture and Forestry)
BMU	Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety)
BMV	Bundesminiserium für Verkehr (Federal Ministry of Transport)
BMVg	Bundesministerium der Verteidigung (Federal Ministry of Defence)
BMZ	Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung (Federal Ministry for Economic Cooperation and Development)
BSPA	Baltic Sea Protected Area
CATIE	Central American Agricultural Research and Training Centre
CBD	Convention on Biological Diversity
CCAMLR	Council on the Conservation of Antarctic Marine Living Resources
CFC	Chlorofluorocarbons
CGIAR	Consultative Group on International Agricultural Research
CGRFA	Commission on Genetic Resources for Food and Agriculture
CHM	Clearing-House Mechanism
CIFOR	Centre for International Forestry Research (Research institute under the umbrella of the CGIAR)
CIS	Commonwealth of Independent States
CITES	Convention on International Trade in Endangered Species
CMS	Convention on Migratory Species
CORINE	Community-Wide Coordination of Information on the Environment
CSD	Commission on Sustainable Development
DBU	Deutsche Bundesstiftung Umwelt
DGfZ	Deutsche Gesellschaft für Züchtungskunde
DNR	Deutscher Naturschutzring
DSM	Deutsche Sammlung von Mikroorganismen und Zellkulturen
EC	European Community (Communities)
ECNC	European Centre for Nature Conservation
ECP/GR	European Cooperative Programme on Genetic Resources
EIA	Environmental Impact Assessment
EPPO	European and Mediterranean Plant Protection Organisation
EU	European Union
EUFORGEN	European Forest Genetic Resources Programme
FAIR	Fisheries, Agriculture and Industrial Research
FAM	Forschungsverbund Agrarökosysteme München
FAO	Food and Agriculture Organisation
FIP	Fördergemeinschaft Integrierter Pflanzenbau

FÖJ	Freiwilliges Ökologisches Jahr
GEF	Global Environment Facility
GEH	Gesellschaft zur Erhaltung alter und gefährdeter Haustierrassen
GENRES	Information System Genetische Ressourcen
GTZ	Gesellschaft für Technische Zusammenarbeit
HABITAT	UN Conference on Settlements
HELCOM	Helsinki Commission
ICES	International Council for the Exploration of the Sea
ICID	International Commission on Irrigation and Drainage
ICIMOD	International Centre for Integrated Mountain Development
ICRAF	International Centre for Research in Agroforestry (Research institute under the umbrella of the CGIAR)
IFF	Intergovernmental Forum on Forests
IGR	Informationszentrum für Genetische Ressourcen
IICA	Instituto Interamericano de Cooperatión para la Agricultura
IIED	International Institute for Environment and Development
IKSR	Internationale Kommission zum Schutze des Rheins
IPF	Intergovernmental Panel on Forests
IPGRI	International Planet Genetic Resources Institute (Research institute under the umbrella of the CGIAR)
IPK	Institut für Pflanzengenetik und Kulturpflanzenforschung
ITUT	Internationales Transferzentrum für Umwelttechnologie (International Transfer Centre for Environmental Technology)
IUCN	World Conservation Union
IWC	International Whaling Commission
LANA	Länder-Arbeitsgemeinschaft Naturschutz, Landschaftspflege und Erholung
MKRO	Ministerkonferenz für Raumordnung
NGO	Non-governmental Organisation
OECD	Organisation for Economic Cooperation and Development
OIE	Office Internationale des Epizooties (Office for International Epizootics)
SADC	Southern African Development Coordination Conference
SCOPE	Scientific Committee on Problems of the Environment
SHIFT	Studies on Human Influence on Floodplains in the Tropics
UBA	Umweltbundesamt (Federal Environmental Agency)
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	Untied Nations Educational, Scientific and Cultural Organisation
UNFCCC	United Nations Framework Convention on Climate Change
UPOV	Union Internationale pour la Protection des Obtentions Végétales (International Union for the Protection of New Plant Varieties)
WIR	World Resources Institute
WWF	World Wide Fund for Nature
ZADI	Zentralstelle für Agrardokumentation und -information

Annex

Contributions by non-governmental organisations and associations to the implementation of the Convention on Biological Diversity (a selection)

Presented below are contributions by social groups to this National Report. In each case, the content is solely the responsibility of the organisation named as the contributor.

A crucial outcome of the 1992 UN Conference on Environment and Development (UNCED) in Rio de Janeiro was the understanding that the principle of sustainable development affects every sector of politics and society. The commitment and participation of all groups is necessary for effective implementation of the goals, measures and mechanisms associated with all the programme areas of Agenda 21 - and thus of the Convention on Biological Diversity. Non-governmental organisations and associations play an important role, firstly because they have sound and varied experience, expertise and skills, especially in the field of biodiversity, and secondly because they enjoy a high degree of public credibility and approval thanks above all to their independence and the responsible and constructive role they perform in our society.

Agenda 21 calls for the participation of non-governmentally organised groups and, to this end, demands new approaches in developing and implementing strategies, action plans and programmes to conserve biological diversity.

The constitutional and legal order in Germany offers the public numerous opportunities, at all levels of government, for involvement and participation through elections and voting rights, freedom of expression and the right to demonstrate and petition. The public and associations enjoy legally guaranteed rights of information, hearing and participation in relation to concrete planning processes and projects, especially under the laws governing nature conservation and building and planning. Moreover, voluntary and informal forms of cooperation between government agencies and associations have evolved, such as holding rounds of talks and hearings on important projects, appointing association representatives to advisory bodies, and entrusting associations with the stewardship of protected areas.

In the Federal Republic of Germany, a further step has been taken in this direction with the participation of non-governmental organisations and associations in preparing this National Report. These organisations were invited, along with the Federal Ministries and the *Länder* governments, to compile contributions to the National Report on Biological Diversity, which are published here in the Annex and thus made accessible to the public. The practical examples of the associations' work underscore the special significance of the non-governmental organisations, and above all the nature conservation associations, in breathing life into the provisions of the Convention on Biological Diversity.

In consulting with the non-governmental organisations and associations, a hearing was held at which intensive discussion took place on their criticisms of the draft report and proposals for far-reaching additions. However, at a final ministerial meeting these were deemed to be impracticable on a number of points.

The nature conservation associations generally welcome the inclusion of the major social groups in the compilation of the National Report on Biological Diversity. The nature conservation associations in particular take the view that this represents an important step in the practical implementation of Agenda 21 at government level. However, they also note that the present report does not, in their view, respond adequately to the framework guidelines proposed by the 2nd Conference of the Parties in 1995 in Jakarta. The associations argue that, in accordance with these guidelines, concepts and strategies ought to have been developed in order to take immediate action to counteract the ongoing and, in places, dramatic loss of biological diversity in Germany.

The strategies set out only in general terms in this first National Report will, in subsequent steps, have to undergo more detailed elaboration, since the conservation of biological diversity in Germany has not yet been adequately secured either at Federal or *Länder* level. The nature conservation associations take the view that the report does not present this imperative with the necessary urgency.

Identification and monitoring by voluntary workers: the case of the *Naturschutzbund Deutschland e.V.* (NABU)

The national specialist committees and national working parties of the Naturschutzbund Deutsch-

land, which is one of the oldest and, with 230,000 members, largest nature conservation organisations in Germany, thousands of specialists are voluntarily involved in monitoring and protecting virtually all groups of species, including higher plants, fungi, mammals, small mammals, bats, birds, amphibia, reptiles, fishes and insects. For instance, NABU's national specialist committees and national working parties play a major role in surveying Germany's mushrooms, mapping bat sites and preparing an atlas showing the geographical ranges of European butterflies. Some of these bodies not only issue circulars but also publish specialist journals presenting the latest research findings. A traditional focus of their work is the monitoring of avifauna. Other national specialist committees are concerned with large-scale protected areas and questions of sustainable land-use. Government authorities also draw upon the expertise that is mobilised in this way. A case in point is the collaborative work at both Federal and Länder level to compile "Red Lists". In making its contribution, NABU works closely with two other bird protection organisations, the *"Deutscher Rat für Vogelschutz"* and the *"Dachverband Deutscher Avifaunisten"*. For instance, the monitoring of waterfowl has been carried out entirely on a voluntary basis in Germany.

[Contribution by *the Naturschutzbund Deutschland e.V.*]

"Noah's Ark": the role of zoological gardens in implementing the Convention on Biological Diversity

The World Zoo Conservation Strategy (WZCS), which was launched in 1993, is a response by zoological gardens to the challenges presented by the Convention on Biological Diversity, especially under Articles 9 (Ex-situ Conservation), 12 (Research and Training) and 13 (Public Education and Awareness).

The World Zoo Organisation (WZO) developed an action plan in 1995 entitled "Zoo Future 2005" in order to attain the goals of the WZNS. It has been translated into German to encourage the German zoos to commit themselves to the strategy.

Ex-situ populations are being managed on a cross-zoo basis under the European Endangered Species Programmes (EEP) taking into account the current state of knowledge on genetics and population demography. At present there are 177 EEPs and 35 European studbooks. The zoos' animal stocks are to be used for reintroduction projects (e.g. lion-tamarins, addax antelopes, European wildcats). Apart from their role in reintroduction projects, zoological gardens are increasingly participating, either individually or through partnerships, in *in-situ* research and protection projects, although these are predominantly in developing countries, such as Madagascar, Congo, Brazil, Vietnam and the Philippines.

Ex-situ populations are used for research connected with nature conservation. To make better use of this potential, the zoos are increasingly entering into cooperative projects with universities and other research institutions. In so doing, the German zoos have found a strong partner in the Berlin-based Institute of Zoological and Wild Animal Research *(Institut für Zoo- und Wildtierforschung).*

[Contribution by Cologne Zoo on behalf of the *Verband Zoologischer Gärten*]

The TRAFFIC programme for observing and reducing the illegal trade in wild animal and plant species

The TRAFFIC programme is a nature conservation network that has been in existence since 1979 and is jointly organised by the World Wide Fund for Nature (WWF) and the World Conservation Union (IUCN). The aim of TRAFFIC is to ensure that trading in wild flora and fauna and their products takes sustainable forms and adheres to national and international conservation regulations and laws. TRAFFIC is achieving this by investigating, monitoring and documenting the trade in wild species. As the largest global network of experts in this field, TRAFFIC operates in 18 countries on 5 continents. The work of TRAFFIC in Germany and in Russia is financed by the environmental foundation, WWF. The latest investigations - in part conducted with the support of the Federal Office for Nature Conservation - centred on Russia's role as a supplier of products derived from endangered species, the import of medicinal plants from India, and the consequences of the trade in sturgeon and

caviar. The joint scientific findings on the scale of the caviar trade furnished the basis for Germany's motion at the 1997 Conference of the Parties to CITES in Harare for all sturgeon species to be included in Annex II of the Convention. This motion was passed unanimously.

[Contribution by *WWF Deutschland*]

German breeding associations' contribution to the conservation of phytogenetic resources

The approximately 100 member companies of the Federal Association of German Plant Breeders *(Bundesverband Deutscher Pflanzenzüchter e.V)*, which represents virtually all commercial breeders in Germany, participated in a survey organised by the International Association of Plant Breeders for the Protection of Plant Varieties (ASSINSEL). According to this survey, breeding establishments devote an average of 5% of their research budget to the maintenance of internal gene banks. In addition to maintaining their own parent material, the breeders also maintain old varieties (84% of replies), local varieties (72% of replies) and wild species (53% of replies).

[Contribution by the *Bundesverband Deutscher Pflanzenzüchter e.V.*]

Conservation of Old and Endangered Livestock Breeds

The latest FAO studies show that, of the approximately 4,000 breeds of domesticated animals being reared throughout the world, 1,500 are endangered. Numerous breeds have already disappeared in Germany. National and international efforts are needed to conserve genetic diversity among farm animals.

In general we owe the survival of traditional breeds to a small number of tradition-conscious farmers with strong local roots. Considerable efforts are needed to establish a wider commitment to conserving the remaining stocks of old livestock breeds. Public attention must be drawn to the special qualities of old breeds, their attractive appearance, their cultural and historical value, but also the economic advantages they offer under specific conditions. That is why the society for the conservation of old and endangered livestock breeds, the *Gesellschaft zur Erhaltung alter und gefährdeter Haustierrassen e.V.;* (GEH), a private non-profit association, is primarily concerned with live conservation of old livestock breeds, using the instruments of publications, exhibitions, supporter and breeder coordination, data registration and active live conservation by the association's own genetic reserve groups. Every year the GEH takes part in a large number of regional and supra-regional exhibitions, trade fairs and farm festivals, runs ambitious press campaigns and contributes articles to the trade and the general press.

In many cases, the old breeds are either not recognised by state breeding institutions or no pedigree registers or stock data exist. When pedigree breeding based on herdbooks was introduced at the request of interested breeders and GEH members, some breeds enjoyed a revival. For instance, at a major agricultural show the presentation of a rare sheep called the *Coburger Fuchsschaf* aroused so much interest that stock numbers have risen from 280 head to 6,000 over the last ten years. Yet in all too many cases emergency action has to be taken to save the last few remaining animals, by buying them up and entrusting them to a reliable breeder.

In recent years, cooperation with nature conservation associations and environmental organisations as well as governmental nature conservation agencies has become increasingly important. Discussion is focusing more and more on landscape management and extensification. Interest in integrating old domesticated breeds into measures in these two areas has constantly grown, so that the GEH is frequently called in as an advisory institution.

The establishment of a nationwide network of *ARCHE* farms enabled the GEH to continue its active contribution to preserving animal stocks. There are now 26 *ARCHE* farms located all over Germany. They are working farms committed to species-appropriate animal husbandry and active breeding of endangered livestock breeds.

Government assistance to promote old livestock breeds under the provisions of EC Regulation 2078/92 only makes sense if interested breeders can be found. That said, it does provide an important basis for preserving or expanding existing

populations. The GEH gave advice on the compilation of the EU lists of animals for which grants may be awarded and it also has a significant influence within various policy-making bodies. The GEH belongs to a number of international organisations concerned with the field of farm animals and crops and played an active role in the foundation of some of these organisations.

[Contribution by the *Gesellschaft zur Erhaltung alter und gefährdeter Haustierrassen e.V.*]

Organic farming

Organic farmers dispense with the use of chemically synthetic plant protection agents and nitrogen fertilisers or other highly soluble mineral fertilisers. Healthy food is produced and livestock is humanely reared in species-appropriate conditions with minimum impact on resources. Organic farming also contributes to the conservation of biological diversity. Organic farmers introduce greater diversity to crop rotation than do farmers following conventional systems. This diversity refers both to the varieties being cultivated and to the species of crop. Since organic farmers operate without the use of chemically manufactured inputs (nitrogen fertilisers and chemical plant protection agents), crop production is far more extensive. As a result, a much greater variety of flora can thrive alongside the cultivated plants.

Various groups sympathetic to organic farming are involved in the breeding of varieties that are used particularly in organic cultivation. They also provide general support for the preservation of the diverse varieties or old crop varieties cultivated on traditional farms.

Associations active in the field of organic farming are organised under the umbrella of the *Arbeitsgemeinschaft Ökologischer Landbau e.V.* (AGÖL). They are particularly concerned with the relationship between agricultural production, healthy food and conserving the traditional countryside.

[Contribution by the Organic Farming Association *(Arbeitsgemeinschaft Ökologischer Landbau e.V.;* AGÖL)]

Cooperation models for integrating land users into nature conservation for the marketing of regional products

In recent years, nature conservation associations and the countryside stewardship associations, known as *Landschaftspflegeverbände*, have stepped up their efforts throughout Germany to undertake nature conservation and landscape management efforts through cooperation with farmers. In particular, this approach has the following advantages:

- By integrating land users in ecologically sound management schemes, the products obtained (especially green forage) can be utilised through recycling in closed material cycles. There is no waste that might require costly and ecologically questionable disposal.
- Many of the products obtained can now be sold again and there availability is leading to a revival of economic interest in the conservation of certain forms of use (e.g. traditional orchards).
- The marketing of the products can become a tool for raising environmental awareness among consumers and showing them ways of acting in an environmentally responsible manner.
- Acceptance of the need for nature conservation is enhanced through cooperation with the land users.

In developing these cooperation models for integrating land users into nature conservation, one of the most promising fields of action has turned out to be the marketing of regional products of certified origin that conform to guaranteed nature-friendly production criteria. Some of these products can be marketed under special product names. The following products and regions highlight this trend:

- traditional orchard fruits in many regions of Baden-Württemberg, Bavaria, Hessen and, to some extent, in the new *Länder* and in southern Lower Saxony,
- meat from free-ranging sheep herds in the areas of the Schwäbische and Fränkische Alb, the Rhön, the Lüneburger Heide, on the expansive boglands of Lower Saxony and Westphalia, in certain Hessian upland regions and, to some extent, in Mecklenburg-Western Pomerania,
- hay from extensive use of grasslands, for in-

stance in the Dumme lowland in the area situated the regions of Altmark and Wendland, in the Thüringer Wald, the Frankenwald and (in the first stages) in Rhineland-Palatinate,

- wood and wood products (for example, wood extracted from coppice and composite forests for use in chip-burning heating plants) in numerous regions across Germany,
- a broad regional assortment of numerous products (for example, from the Rhön or the district of Fürstenfeldbruck).

These regional products are meeting with an increasing demand on the part of consumers for products of guaranteed origin and quality and freshness assured by short-distance supply lines, as well as for regional specialities (such as lamb from the juniper heaths of the Altmühltal). Discussion and dispute on intensive farming and the debate over BSE and other food scandals are changing attitudes among consumers, so that we can expect to see a steadily expanding market for food from environmentally sound production.

[Contribution by the *Deutscher Verband für Landschaftspflege e.V.*]

Examples of contributions by forestry and forestry science associations to the implementation of the Convention on Biological Diversity

Deutscher Forstwirtschaftsrat

The *Deutscher Forstwirtschaftsrat*, i.e. German Forestry Council, has been representing the entire forestry sector (state, institutional and private forests), the relevant scientific institutions, professional organisations and forestry associations ever since 1950.

The forestry sector in Germany has a long tradition of practising sustainable forest management. The conservation and enhancement of biological diversity is one of the central goals of this type of sustainability-oriented management and must be linked to both the economic aims of forestry and the aims of upholding the forest's other protective and recreational functions.

As silvicultural and structural conditions may differ, a variety of measures and projects must be developed to suit varying types of forest ownership and Länder circumstances. The following projects, which are all supported by the *Deutscher Forstwirtschaftsrat*, illustrate this approach:

- forest biotope mapping to identify and record rare and endangered forest biotopes, some of which also enjoy statutory protection;
- the designation of a network of Woodland Protection Areas serving the undisturbed natural development of particular forest communities or the conservation of particular management methods as well as research;
- measures in institutional and private forests to foster semi-natural forestry, which in many cases can be assisted under the respective funding guidelines of the *Länder*;
- technical forestry plans that also serve to conserve and strengthen multi-functional forestry and thus enhance efforts to conserve biological diversity.

[Contribution by the *Deutsche Forstwirtschaftsrat e.V.*]

Arbeitsgemeinschaft Deutscher Waldbesitzerverbände e.V.

The Arbeitsgemeinschaft *Deutscher Waldbesitzerverbände e.V.* acts as a national umbrella organisation for the numerous regional forest owners associations and silviculturalist organisations representing non-governmental forest owners.

Forests in the Federal Republic are, almost without exception, cultivated - i.e. managed or commercial - forests and form an irreplaceable structural element in such a densely populated industrialised country as Germany. They are characterised by great biological diversity.

Furthermore, these forest resources display high growth rates and rising standing volumes, thus ensuring that forests will continue to fulfil their varied and wide-ranging functions for future generations with respect to use, climate, conservation and recreation.

Forest damage caused by pollution undermines the commercial foundations of the forest owners and impairs the functioning of the forest's ecosystem.

The Arbeitsgemeinschaft *Deutscher Waldbesitzerverbände* supports the demands for the extension of the instrument of contract-based nature conservation, for the scientific study of changes in the spectrum of species (impact of pollutant inputs), the use of eco-audits for timber and the promotion of forestry as part of the Joint Federal-Länder Task of Improving Agricultural Structures and Coastal Protection.

[Contribution by the *Arbeitsgemeinschaft Deutscher Waldbesitzerverbände*]

Deutscher Forstverein e.V

The *Deutscher Forstverein* is the umbrella organisation of the *Länderforstvereine*, i.e. forest associations that bring together forestry experts, forest owners, scientists, forest enthusiasts and forestry organisations. The organisation is committed to conserving the forests and promoting forestry and forest science and provides specialist training for its members.

The *Deutscher Forstverein* sees the exchange of ideas and the transfer of knowledge on the significance of woodlands as one of its central roles. The *Deutscher Forstverein*, along with its affiliated *Länder* associations, fosters this exchange of ideas among all sections of society that have an interest in forests and is politically active in pursuit of forest conservation and the improvement of the framework conditions for forests. Regular meetings, field trips, publications and political activities are central to these efforts.

The Deutscher Forstverein discusses conservation and biological diversity issues in detail in its recent publication entitled *"Naturschutz im Wald - Generationenvertrag zwischen Mensch und Natur"*, i.e. nature conservation in forests as an intergenerational contract between man and nature. Moreover, in its public relations work it joins other partner organisations in making a special effort to reach children, possibly the most important target group in society.

[Contribution by the *Deutscher Forstverein e.V.*]

***Schutzgemeinschaft Deutscher Wald e.V.* (SDW)**

The German Forest Protection Association *(Schutzgemeinschaft Deutscher Wald e.V.* SDW) came into being in 1947 as an environmentally concerned "citizens action group" dedicated to restoring Germany's woodlands after the severe damage incurred during the War. Today, the group is committed to forest conservation worldwide.

The SDW sees one of its central missions as providing the public with objective information at Federal, *Länder* and local authority level. Collaborating both nationally and internationally with a host of governmental and non-governmental partners, it is engaged in various practical projects connected with implementation of the Convention on Biological Diversity.

In implementing the Convention on Biological Diversity, even more attention must be given to the presentation of viable examples and models (especially positive examples to provide motivation). In 1995, as part of the 2nd European Nature Conservation Year, the SDW initiated an alluvial forest project in the area of the three-Länder triangle where Lower Saxony, Thuringia and Hesse meet, working as a joint effort with the *Vereinigung Deutscher Gewässerschutz* (VDG), the *Wilhelm-Münker-Stiftung* and wildlife documentary maker Heinz Sielmann. School students from Germany and Poland worked on the project. Along with other projects, it is now making a considerable contribution to the promotion of biological diversity in this predominantly agricultural region.

[Contribution by the *Schutzgemeinschaft Deutscher Wald e.V.*]

***Arbeitsgemeinschaft Naturgemäße Waldwirtschaft* (ANW)**

The Association for Natural Forestry *(Arbeitsgemeinschaft Naturgemäße Waldwirtschaft*; ANW) sees itself as a proponent of multi-functional forestry in Germany and neighbouring countries. Founded in 1950, it is primarily engaged in setting up model forestry operations in which the principles of naturalistic forestry are tested, applied and demonstrated in practice. Its guiding concept is that of the "continuous forest" *(Dauerwald)*, which implies a departure from the concept of

even-aged stands. The aim is a multi-aged mixed forest consisting of as many site-appropriate tree species as possible, managed without clear-cutting and carefully stewarded. Among the many advantages of this approach are:

- reduced risk of biotic and abiotic damage;
- higher proportion of heavy timber;
- higher rate of natural rejuvenation;
- maintenance of autochthonous genetic potential;
- lower operating risk and an improved ratio of standing to extracted stock, resulting in higher yields;
- reduced workload for harvesting and forest rejuvenation and for protecting and managing the young trees;
- ability to respond flexibly to market demands.

[Contribution by the *Arbeitsgemeinschaft Naturgemäße Waldwirtschaft*]

"Wood from sustainable forestry": eco-labelling by the *Deutscher Forstwirtschaftsrat*

Policy-makers have become increasingly aware of the necessity to preserve forests worldwide since the UN Conference on Environment and Development in Rio de Janeiro in 1992, if not earlier. The Statement of Forest Principles agreed in Rio de Janeiro prompted international activity to develop criteria and indicators for sustainable forest management. Thus, the Ministerial Conference on the Protection of Forests in Europe meeting in Helsinki in June 1993 adopted the following criteria for application at national level:

- conservation and appropriate enhancement of forestry resources and their contribution to global carbon cycles,
- conservation of the health and vitality of forest ecosystems,
- conservation and promotion of the productive functions of forests (timber and non-timber products),
- conservation, protection and appropriate enhancement of biodiversity in forest ecosystems,
- conservation and appropriate enhancement of the protective functions through forest management (particularly soil and water),
- conservation of other socio-economic functions and conditions.

If we assess the forestry situation in Germany against the criteria adopted at Helsinki, it becomes clear that forests in the Federal Republic of Germany are being managed sustainably. The sustainable management includes here the comprehensive safeguarding of all the forest functions of use, protection and recreation.

In promoting a label of origin that guarantees "wood from sustainable forestry - grown in Germany's forests", the *Deutscher Forstwirtschaftsrat* seeks to make the public at large aware that forest legislation and forestry practice are guided by the principle of sustainability and meet internationally recognised criteria. The consumer can be certain that wood bearing this label has been produced in a manner that accords equal importance to ecological criteria as to economic requirements. This approach ensures that future generations can continue to have sufficient supplies of wood without a damaged environment.

[Contribution by the *Deutscher Forstwirtschaftsrat*]

Nature and species protection projects run by German hunting organisations

German hunting organisations are making great efforts to restore habitats in which the flora and fauna have suffered to a more natural and game-friendly condition. Hunters are involved in a wide spectrum of nature conservation options, from biotope protection and biotope networking through to selective species protection programmes.

To implement nature conservation measures, the major *Land* hunting associations in Germany have founded their own natural land *(Naturland)* or gameland *(Wildland)* societies. In general, they acquire valuable and threatened biotope sites and, in collaboration with local hunters and other nature conservationists, take care of their maintenance and management. A crucial aspect is the mainten-

ance of close and constructive cooperation with the nature conservation and forestry authorities and with local nature conservation organisations.

Difficulties often arise when the land to be acquired is in private hands. It is not uncommon for the success of a measure to depend on the purchase of a whole number of small but contiguous pieces of land. The time-consuming negotiations involved frequently cause long delays before sensible nature conservation measures can be put into practice. A further problem may be the long periods required for approval by the competent authorities.

In order to counter the multifarious strains on our environment, it is necessary to study the ecosystem as a whole. Of central importance to this research is the recording of game populations. Work is to continue on the compilation of the game registers that are already being prepared by some *Land* hunting associations. They supply valuable information on the occurrence of animals living in the wild and the ecosystems associated with them. The widespread presence of hunters and their familiarity with the hunting ground and the local countryside put them in an ideal position to perform this work.

Interest in nature should be aroused in young people as early as possible, since it is an essential prerequisite for ecologically and environmentally sound behaviour. This is where the German hunting community's campaign entitled "Learning in Nature" *("Lernort Natur")* comes in. The campaign, which has been running for a number of years, focuses on educational measures for children. Working together with the teachers, hunters invite children to come to their local hunting-grounds and try to introduce them to the indigenous flora and fauna and give them a first impression of ecological relationships through hands-on learning in the field. Supplementary to these field trips, some of the *Land* hunting associations or their sections are equipped with information vehicles ("Mobile forest schools"), which contain suitable visual aids and teaching material. Schools can make an appointment for them to come and visit.

[Contribution by the *Deutscher Jagdschutz-Verband e.V.)*]

Conference on "Ways forward for nature-friendly and landscape-compatible sport" held by the *Deutscher Naturschutzring* (DNR)

In October 1996, the German umbrella organisation of environmental protection and nature conservation associations, *Deutscher Naturschutzring*, and the *Deutscher Sportbund*, which represents sporting associations, jointly organised a congress on "Ways forward for nature-friendly and landscape-compatible sport". With this event, the *Deutscher Naturschutzring* (DNR) took an important step towards the goal of defining the future framework for leisure, recreation and sport in Germany.

The DNR sees the new framework as being characterised by:

- the priority of nature conservation over all forms of recreational use and leisure activity whenever natural or semi-natural, rare or endangered biotopes and ecosystems are concerned,
- creation of attractions and amenities for leisure activities outside sensitive areas,
- development of nature-compatible forms of sport in areas of limited resilience,
- providing facilities to meet recreational needs in the vicinity of residential areas,
- enhancing the recreational value of cleared, nature-depleted landscapes,
- providing information on ecological relationships, leisure behaviour and control of recreational visitors.

The nature conservation associations believe that intensive efforts should be made to establish this new framework in practice.

The DNR is gradually applying these criteria. The guidelines issued by the DNR serve as a basis for further talks and for the further implementation of goals. They are characterised by:

- the acceptance of ecological limits,
- the development of detailed zoning and control mechanisms,
- the cultivation of nature-friendly forms of sport and recreation, and
- a change in consciousness and behaviour patterns on the part of active sports enthusiasts and recreational visitors.

[Contribution by the *Deutscher Naturschutzring e.V.*]

Initiatives by *Sport mit Einsicht e.V.*

Sport mit Einsicht e.V., a non-governmental organisation promoting responsibility in sport, is committed to achieving greater environmental compatibility in this field. It believes that priority must be given to conflict-resolution strategies and strategies for use that are jointly developed and supported by both nature conservation and sporting organisations.

The following activities pursued by *Sport mit Einsicht* are or were designed to achieve the goals of the Convention on Biological Diversity:

- organising a symposium in the form of a "Round Table on Sport and Nature" (1995),
- organising a symposium on "Sport and Nature - Strategies for Resolving Conflicts" (1996),
- running a project on "Environmental Education in Sport", providing courses for trainers in various types of nature-interaction sports (1994-1997),
- producing and publishing a book on "Environmental Protection in Sports Clubs - A Guide for Club Activities", which includes recommendations on site-appropriate greening of land adjacent to sports facilities (appeared in 1997).

[Contribution by the *Sport mit Einsicht e.V.*]

Countryside stewardship associations: a model for successful cooperation

The idea of *Landschaftspflegeverbände*, or countryside stewardship associations, was first developed in 1986 in the Free State of Bavaria and was then taken up by the other Länder. Since 1990 numerous Countryside Stewardship Associations have been founded in the new (eastern) *Länder* in particular.

Landschaftspflegeverbände are a voluntary coalition of nature conservation organisations, farmers and local politicians. They see themselves as partners cooperating with nature conservation and agricultural authorities, which they assist in the implementation of goals in the sphere of nature conservation, landscape management, sustainable regional development, environmental education and environmentally compatible recreation concepts. A characteristic of their work is the integration of different groups in society. The executive board of an Association is comprised of representatives of agriculture, nature conservation and local government, all of whom have an equal voice and work together on a voluntary basis.

The *Landschaftspflegeverbände* are also characterised by the fact that they operate at regional level and are thus able to take account of the specific peculiarities of the natural environment and the cultural, historical and social developments in the locality. This regional dimension is an important factor in having the local population identify with the work of the associations.

Landschaftspflegeverbände have the status of a non-profit organisation and enjoy no official powers. They only act in response to requests from third parties.

The *Landschaftspflegeverbände* want to

- lend impetus to ecologically oriented economic development on the basis of regional peculiarities,
- establish a comprehensive network of natural habitats,
- provide farmers with a reliable source of additional income from nature conservation and assist them with the marketing of typical local products.

So far, 120 such countryside stewardship associations have been formed in Germany. Active in ten *Länder*, they are organised under the umbrella of their national federation, the *Deutscher Verband für Landschaftspflege*. Their broad presence enables them to carry out an enormous number of different measures and activities, such as:

- planning, organising, introducing, implementing and supervising biotope management measures and their implementation by local farmers,
- implementing biotope network concepts,
- promoting the extensification of agricultural use by means of contract-based nature protection programmes,
- performing regional educational and public

awareness activities to promote nature conservation and landscape management,

- marketing agricultural products from properly stewarded countryside,
- protecting culturally and historically important landscape elements,
- taking initiatives to support sustainable regional development.

[Contribution by the *Deutscher Verband für Landschaftspflege e.V.*]

The contribution of botanical gardens to the implementation of the Convention on Biological Diversity

The *Verband Botanischer Gärten*, a national association of botanical gardens in Germany, has commissioned a report on the "Contribution of German Botanical Gardens to the Conservation of Biological Diversity and Genetic Resources". Its terms of reference include the formulation of concrete recommendations for the botanical gardens in Germany on topics including the networking of activities, research needs, public relations, prioritising fields of work, specialisation and the division of labour, documentation, the gathering, management and exchange of data and international cooperation.

For the issue of biodiversity, botanical gardens represent an interface of potentially great importance at a number of socio-political levels. They can, for instance, contribute to the implementation of a whole number of the articles contained in the Convention on Biological Diversity and develop their own ideas on the promotion of conservation and sustainable use of biological diversity. Their potential lies in the following characteristics and activities:

- botanical gardens are often connected with scientific institutions and in some cases have great experience in monitoring and conserving biological diversity and assessing potential threats to it;
- botanical gardens can participate in many ways in the selection, institution, assessment, administration and enhancement of protected areas and in the renaturation of anthropogenically disturbed ecosystems. In many cases they are already doing so. Opportunities for cooperation with the relevant partners exist at national and international level. For example, the Verband *Botanischer Gärten* is soon to conclude an agreement on cooperation with the LNU *(Landesgemeinschaft Naturschutz und Umwelt)*, a conservationist organisation active in North-Rhine/Westphalia. In a further initiative, it is planned to approach those local authorities that run a botanical garden and want to establish a Local Agenda 21 with a view to persuading them to enter into partnerships with the indigenous communities of a protected area or threatened tropical ecosystem and to use the botanical gardens to project and promote this partnership;
- botanical gardens can do a great deal at national level to help carry out ex-situ measures to protect plants;
- botanical gardens can establish how much use a particular habitat can cope with before that use ceases to be sustainable. They are also active in identifying and developing economically promising species;
- the botanical gardens play an indispensable role in providing German botanists and ecologists with a rounded education. Nevertheless, there is still great potential for more to be done in this direction, especially in the context of cooperation with countries of origin;
- botanical gardens offer a unique window on the world of plants and the whole set of issues surrounding the relationship between man and the environment. The public use this window in their millions. As part of a model educational and public awareness programme for visitors to botanical gardens, it is planned to convey to the public a deeper understanding of the Convention on Biological Diversity in all its facets by means of a travelling exhibition shown inside the gardens themselves. Work on a booklet on the topic of "German Botanical Gardens and the Biodiversity Convention" is already in the advanced stages;
- botanical gardens, or rather their highly qualified staff, contribute their expertise to environmental impact assessments;
- botanical gardens will make an important con-

tribution to the arrangements for regulating access to genetic resources. A code of conduct for the staff of botanical gardens is being prepared and will ensure that the handling of biological material is always in compliance with the provisions of the Convention on Biological Diversity. Moreover, the Material Transfer Agreements already being enforced in some cases must be nationally harmonised;

- botanical gardens will take it upon themselves to ensure that their partners in the countries of origin have access to important technology. It is planned to develop a model project for bilateral research cooperation;
- the association intends to record all the stocks of botanical gardens and make this information available to the public, presented in appropriate detail. The recorded data on biological diversity are also to be presented to the relevant journals of the countries of origin. The Internet shall also be used for this purpose in the future. To this end, the association is closely collaborating with the German Clearing House Mechanism (cf. Chapter 5.9.2).

[Contribution by the research and development project "Contribution of the German Botanical Gardens to the Conservation of Biological Diversity and Genetic Resources", commissioned by the *Verband Botanischer Gärten e.V.*]

Public information programmes of the Nature Conservation Federation of Germany (NABU)

Raising public awareness is a central concern of the national nature protection federation, the *Naturschutz Deutschland* (NABU). Its efforts to promote awareness represent a particularly appropriate response to the demands formulated in Article 13 of the Convention on Biological Diversity. For instance, the "Bird of the Year" campaign, which NABU has been running since 1971, promotes awareness by featuring a different species each year, highlighting its particular habitat and calling for conservation efforts. NABU also organises campaigns on particularly important habitats using a combination of public and media relations, model projects and political lobbying. Since all these campaigns involve NABU's more than 1,500 local groups and contain special campaign elements geared to local issues and local government, they therefore also contribute to local-level implementation of the Agenda 21 action programme.

NABU runs the *Naturschutzakademie Gut Sunder*, a nature conservation academy in Lower Saxony, which is the largest private institution of its kind in Germany. NABU's children's and youth activities are mainly organised through the more than 1,300 groups of its youth wing, the *Naturschutzjugend* (NAJU), as well as in "Rudi-Rotbein" clubs for younger children. With the support of the education and cultural affairs ministries of the Länder, NAJU has been staging an annual "Experiencing Spring" competition for the last 12 years in which children are invited to report four signs of spring and present them in stories and drawings. In the last few years more than 30,000 school students have taken part in this competition. More than 50 nature conservation and information centres run by NABU and its Land associations also contribute a great deal to environmental education "in the locality".

[Contribution by the *Naturschutzbund Deutschland e.V.*]

Contribution of zoological gardens to environmental education

With 30 to 35 million visitors, zoos present enormous opportunities for educating the public about environmental and nature conservation problems, to heightening environmental awareness and fostering commitment to environmental protection and nature conservation. Cologne Zoo and the rain forest and species protection organisation *Arbeitsgemeinschaft Regenwald- und Artenschutz e.V.* (ARA) are currently preparing a wide-ranging pilot project to promote global environmental education in scientifically managed zoos.

[Contribution by Cologne Zoo on behalf of the *Verband Zoologischer Gärten*]

International cooperation on the part of environmental associations (examples)

***Naturschutzbund Deutschland e.V.* (NABU)**

The nature conservation federation NABU is the German partner of the globally active nature con-

servation organisation, BirdLife International. NABU gives worldwide support to BirdLife projects, which combine the protection of priority or endemic species (flagship species) with sustainable use of their habitat by working with indigenous communities. Sustainable uses may include collecting and marketing honey and plant products, growing mushrooms, planting tree nurseries, promoting eco-tourism and other initiatives. Model BirdLife projects are being run in cooperation with government nature conservation agencies and local communities in places such as Vietnam, Dominica, Indonesia, Thailand, the mountain rainforests of Pakistan, the island of Cousin in the Seychelles, and Africa. A central role in these projects is played by the "Endemic Bird Areas" as hotspots of biodiversity.

As part of the BirdLife network, NABU is also entrusted with coordinating the IBA programme in the Commonwealth of Independent States (CIS) and in central Asia. Two major areas of NABU's international work with the national governments, local partners and German governmental institutions, such as the BMU, BMZ, Federal Office for Nature Conservation and GTZ, are the programme for designating Biosphere Reserves in central Asia and the Russo-German cooperation project to protect "World Natural Heritage" in Russia. In addition, NABU support official and voluntary nature conservation at local level in the Nature Conservation Area of Nuratau (Uzbekistan) and in the RAMSAR Danube Delta site in Romania (now also a Biosphere Reserve).

The programme for Biosphere Reserves is designed to combine species protection, site protection, sustainable use and environmental education in exemplary fashion, so that the Biosphere Reserves can serve as model regions for integrating nature conservation and sustainable development. The project's "flagship" species is the snow leopard.

In response to a proposal by the Environment Minister of the Russian Federation, the Russo-German cooperation project "World Natural Heritage in Russia" is seeking the inclusion of 8 Natural Heritage Sites, covering a total area of 20 million ha, in UNESCO's World Natural Heritage List, thus fulfilling Russia's obligations as a signatory to the World Heritage Convention. Greenpeace Russia was entrusted with the task of preparing the nomination documents in 1994 and turned to NABU for assistance. In addition to these organisations, Russian and German government agencies are also assisting in the preparation of applications.

[Contribution by the *Naturschutzbund Deutschland e.V.*]

Umweltstiftung WWF Deutschland

Hardly any other country in Europe has such diversity of landscapes, habitats and flora and fauna as Georgia. Following the political and economic upheavals, the country became receptive to new economic and cultural influences. However, these have been accompanied by developments that are endangering its natural and traditional man-made landscapes. Georgia's previously undisturbed ecosystems are increasingly threatened by uncontrolled land development, logging, overgrazing and poaching. In cooperation with the Georgian government, the environmental foundation *Umweltstiftung WWF*, which is the German representative of the international World Wide Fund for Nature, drew up a long-term programme in 1991 to safeguard the country's biological diversity. The programme's overriding goal is to create a network of protected areas representative of Georgia's different ecosystems in an effort to conserve the entire biological and landscape diversity of the country. With a view to achieving broad public acceptance, the programme is endeavouring to raise people's environmental awareness and persuade them to become actively involved in pursuing the ecologically sustainable use of biological resources.

To achieve these goals, the project includes the following measures:

- drawing up management plans on the basis of sound scientific and socio-economic knowledge, and zoning in accordance with the IUCN classification system,
- providing advice for those preparing nature conservation legislation for Georgia,
- developing and implementing model projects for ecologically and economically sustainable development in the catchment area of protected areas

- creating a network of nature conservation training centres,
- producing nature conservation publications, videos and television programmes,
- organising workshops, conferences, training courses and children's holiday camps.

The project's target groups are the relevant ministries, teachers, students and schoolchildren, and churches and non-governmental organisations at local level.

[Contribution by the *Umweltstiftung WWF Deutschland*]

Stiftung Europäisches Naturerbe (Euronatur)

The environmental foundation Euronatur was founded in 1987 by the three nature conservation and environmental protection organisations, BUND, NABU and *Deutsche Umwelthilfe,* in order to support and promote nature conservation measures in Europe. Its projects focus on work in southern, central and eastern Europe. Its principal idea is to form habitat networks.

Euronatur has been commissioned by the Federal Government to coordinate the establishment of a protected area system on the Albanian side of the transfrontier lakes Ohrid, Prespa and Prespa Minor. Operating as part of a project funded by the GTZ-run sectoral programme entitled "Implementing the Biodiversity Convention", Euronatur is working with Albanian environmental organisations and the Albanian authorities to elaborate and implement the planning framework, legal foundations and development concepts required to set up the network of protected areas. From the planning stage onwards, the project is designed to incorporate the needs of the communities affected. To this end, development concepts for increasing public acceptance of the nature conservation measures are jointly drawn up and implemented. The project includes, for instance, measures to show local people the benefits of the sustainable use of medicinal plants. With the help of German importers and processors, soundly harvested medicinal herbs will be marketed as products of sustainable extraction. This may make a considerable difference to the incomes of the local population, while enabling German consumers to make a contribution to the conservation efforts.

[Contribution by the *Stiftung Europäisches Naturerbe (Euronatur)*]

Cooperation between the Climate Alliance and indigenous peoples

The Climate Alliance *(Klima-Bündnis/Alianza del Clima)* operates as a partnership between European local authorities and indigenous rainforest peoples, linking the protection of the Earth's atmosphere with the safeguarding of the tropical rainforest. The organisation has a current membership of more than 600 towns, communities and districts. *Länder* and non-governmental organisations are also involved as associate members.

Working in a project entitled "Protecting, using and securing biological resources and the rights of indigenous peoples" and cooperating directly with the Land development cooperation office at the Berlin Senate's industry and enterprises agency *(Berliner Senatsverwaltung für Wirtschaft und Betriebe),* the Climate Alliance supports a clarification and strategy development process initiated by COICA, the coordinating body of Indian organisations in the Amazon Basin, the aim of which is to integrate proposals from the indigenous peoples into efforts to implement the relevant provisions of the Convention on Biological Diversity. The project contributes to the implementation of Article 8j and other relevant Convention Articles concerning the rights of indigenous peoples or local communities leading traditional lifestyles with regard to knowledge, innovations and practices of relevance to biological diversity. The project was conceived as preparation and back-up for the five-day workshop that took place in Montreal (Canada) in November 1997 pursuant to a decision of the Third Conference of the Parties in Buenos Aires. This workshop was held inter alia to prepare the framework for a work programme for the Conference of the Parties in which full account was taken of the proposals and ideas of indigenous peoples.

The Berlin *Land* development cooperation office provides funding for the project by dint of its membership of the Climate Alliance. The project

runs for two years and entails the organisation of the seminar in 1997 and the provision of funds for compiling legal expertises in 1998.

The seminar promoted by the Climate Alliance supports the COICA (and its nine national member organisations in Amazonia) in its efforts to clarify, with the assistance of legal experts, the way forward in implementing the Convention, to define positions and to find a common strategy. The intention is to elaborate concrete Indian proposals and integrate them into the next stages of the negotiating process provided for under the Convention. The idea is to enable the Indian organisations to establish their own priorities from among the many different possibilities under discussion of protecting and recognising the knowledge, innovations and practices of indigenous peoples with regard to the sustainable use of biological diversity and to make these priorities known in the countries in which they live.

Further funds are available in 1998 to enable the COICA to prepare legal expertises in matters it has accorded priority and to present them in the course of the negotiating process provided for under the Convention.

[Contribution by the *Klima-Bündnis/Alianza del Clima e.V.*]

Initiatives of the *Verband Forschender Arzneimittelhersteller* (VFA)

The VFA, an association representing pharmaceutical manufacturers active in research, has set up a working party in which representatives of various companies engaged in natural materials research can discuss, both among themselves and with the competent authorities, the implications of the Convention on Biological Diversity for their work. Discussion centres on the demand, as formulated in Article 15 of the Convention on Biological Diversity, for the countries of origin to participate in the economic benefits of their genetic resources. This demand is not disputed within the working party.

The VFA accepts its share of the global responsibility for species conservation just as it accepts a responsibility for unimpeded access to and sustainable use of biological diversity for the benefit of humankind. Providers and users of biological resources must cooperate as partners within the framework of existing international law, including legislation on the protection of industrial property, and at generally accepted market terms.

To facilitate implementation in practice, arrangements for access to genetic resources must be kept as simple as possible. The most sensible solution is bilateral contracts between providers and users of these resources. In order to facilitate international agreements that are fair to all parties, nations should frame their laws in a similar way to each other and such voluntary cooperation should be encouraged. The working party generally recommends freely negotiated agreements between providers and user of genetic resources that take account of the concrete necessities and interests of those involved. On the question of "benefit sharing", this can be achieved by employing various models as long as they are designed freely and individually in accordance with the interests and circumstances of each of the parties involved and on their own responsibility.

[Contribution by the *Verband Forschender Arzneimittelhersteller, e.V.*]

Environmentally conscious management: *Bundesdeutscher Arbeitskreis für Umweltbewußtes Management e.V.* (B.A.U.M.)

Commissioned and supported by the Federal Research Ministry (BMBF), B.A.U.M. is carrying out the following two research projects:

- the "Study of acceptability problems blocking implementation of forward-looking environmental management in small and medium-sized enterprises". The aim of the project is to develop practice-oriented multi-media aids to help overcome the specific obstacles small and medium-sized enterprises face in introducing an environmental management system. This represents and important contribution to the process of raising environmental awareness in German industry. It is also an indication to political decision-makers of which policy measures help to point German industry in the direction of sustainable development;
- the project entitled "Concepts for sustainable economic activity in the regions: environmental

management for small and medium-sized local authorities", which is designed to draw together the findings of previous studies and derive guidelines and tools that can be used directly in communities. This project also helps local authorities to integrate ecological concerns in their decision-making.

B.A.U.M. and the *Aktionsgemeinschaft Umwelt, Gesundheit, Ernährung* (A.U.G.E.), an association campaigning on environmental, health and food issues, are supported by the Deutsche Bundesstiftung Umwelt in organising a home-life competition entitled *"Umwelt gewinnt"* (The environment wins). As Germany's biggest competition for domestic households "Umwelt gewinnt" is run under the auspices of all the Land environment ministries and its patron is Federal Environment Minister Angela Merkel. It raises private householders' awareness of environmental protection issues and motivates them to contribute to environmental protection through environmentally sound housekeeping and, in so doing, save money. B.A.U.M. has developed an "eco-check" for the home on CD-ROM, which for the first time enables people to make an comprehensive analysis of all areas of their private life in terms of the drain on natural resources.

B.A.U.M. published a book in the autumn of 1997 on cost-cutting through environmental management *(Kosten senken durch Umweltmanagement)* in which 100 companies present around 1,000 practical examples of investments they have made in the environmental sector that have brought them both ecological and economic benefits.

[Contribution by the *Bundesdeutscher Arbeitskreis für Umweltbewußtes Management e.V.*]

Pictures

- Bildagentur BAVARIA
- Bildagentur Peter Pretscher
- Adrian Bailey, Klaus Bogon, Harms, K.-E.Heers, U. Hirsch, Andy Rouse, H. O. Schulze/ Bildagentur WILDLIFE
- Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung
- Presse- und Informationsamt der Bundesregierung