



Federal Ministry of  
Food, Agriculture  
and Consumer Protection

# National Programme

for the Conservation and Sustainable Use of Plant Genetic Resources  
of Agricultural and Horticultural Crops



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# Foreword

Dear Readers,

Plants provide the foundation of our lives. They are the basis of sustainable agriculture and the source of healthy and safe food. They supply raw materials and energy.

Today we can draw upon a great treasure-trove of plant genetic resources. Our native flora accounts for around 3,500 species. More than 2,800 of these species are either directly usable for food and agriculture or can be put to use in plant cultivation. We also have at our disposal a great genetic diversity of adapted crop plants. This emerged through a constant process of selection and ongoing development and thus through the work of farmers. The diversity of crops, as well as the knowledge about growing, reproducing and using them, are therefore also a significant part of our cultural heritage.

Aside from its economic importance, this diversity of used and usable plants represents a valuable resource for future uses and innovations. New framework conditions, emerging due to shifts in the climate or a change in de-



mand, challenge our plants to adapt. This is where we need to make avail of our plant genetic resources. Diversity is a fundamental prerequisite for future uses and for progress in plant breeding. Biological diversity that has been lost cannot be reproduced. It is for this reason that what is particularly needed is the use of preventive care.

This is where the National Programme enters the picture. It establishes the essential foundation for activities coordinated nationwide and aimed at conserving and sustainably using our genetic resources. The revision takes into account significant developments that have emerged since the first Programme was issued in 2002.

First among these major developments is Germany's participation in the "International Treaty for Plant Genetic Resources for Food and Agriculture" since it committed itself to the Treaty in 2004. The goal of the Treaty is to conserve plant genetic resources for food and agriculture, on a long-term basis, using them sustain-

ably. Germany has solidly backed this Treaty and remains one of its essential supporters. This National Programme plays an important role in the implementation of the International Treaty.

In addition, BMELV's sector-specific strategy "Conservation of Agricultural Biodiversity, Development and Sustainable Use of its Potentials in Agriculture, Forestry and Fisheries" was drawn up. This strategy provides a framework for the national sectoral programmes formulated for plant, animal, forestry, and aquatic genetic resources. It has also been taken into account in producing the new version of the National Programme.

One of the most important assignments facing the National Programme is to draw together all the protagonists involved in the area of conservation and sustainable use of plant genetic resources. A supporting pillar in these efforts is the Advisory and Coordinating Committee for Genetic Resources of Agricultural and Horticultural

Crop Plants. I am happy to take this opportunity to express my particular thanks to the Committee members for their work.

I would also like to thank the many people who make a contribution, through their daily work as farmers, gardeners or other professionals, or through their conscious decisions as consumers, to conserving the diversity that exists today for the generations to come.



Ilse Aigner  
Federal Minister of Food, Agriculture and Consumer  
Protection

# 1 Introduction



In 1999, what was then the Federal Ministry of Food, Agriculture and Forestry (BML) published a Concept for the Conservation and Sustainable Use of Genetic Resources for Food, Agriculture and Forestry, as part of a series of publications (reference: BML Heft 487); this concept was an element of the implementation work on the Convention on Biological Diversity (CBD). The National Programme that was envisaged in this publication consisted of sectoral programmes related to the individual subsections of genetic resources. Building on the Concept for Plant Genetic Resources, published in 1990, the year 2001 saw the elaboration of the first National Programme for Conservation and Sustainable Use of Plant Genetic Resources of Agricultural and Horticultural Crops. This programme was endorsed by the Conference of Agriculture Ministers (of the Federal Government and the Länder) and served until 2011 as the essential basis for activities coordinated nationwide in this area of activity in Germany.

In 2004, the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR) came into force. As an ITPGR contracting state, Germany undertakes an obligation to conserve plant genetic resources for food and agriculture over the long term and to use them in a sustainable way. The contracting states are also obliged to engage in mutual support and international cooperation in their conservation efforts.

In 2007<sup>1</sup>, the Federal Ministry of Food, Agriculture and Consumer Protection (BMELV) formulated its Strategy on Conservation and Sustainable Use of Biological Diversity for food, agriculture, forestry and fisheries (abbreviated: Strategy for Agricultural Biodiversity); this placed the conservation of genetic resources into the context of a broader overarching concept for conserving agricultural biodiversity and using it sustainably. This BMELV strategy supplements the National Strategy for Conservation and Sustainable Use of Biodiversity, adopted by the Federal Cabinet in 2007.

Due to changed framework conditions at national and international level, and taking into account the progress made and experience gained from the implementation process to date in the National Programme, a fundamental update was carried out.

The structure of the second National Programme, now completed, still takes as its orientation point the Global Plan of Action of the Food and Agriculture Organization of the United Nations<sup>2</sup> (FAO) and its four main areas: *In situ* conservation and development, *ex situ* conservation, sustainable use and strengthening of institutional and personal capacities.

The National Programme is accompanied by the Advisory and Coordination Committee for Genetic Resources of Agricultural and Horticultural Crop Plants (BEKO). The latter consists of 17 members, appointed by BMELV from public authorities at Federal Government and Länder level respectively, from trade associations and organisations in science and business; where applicable, members are also appointed to contribute on an individual basis as subject-area experts.

The Federal Government, the Länder, and the various state and private institutions, committees and other parties involved ensure the implementation of the National Programme, through their joint efforts and individual contributions. The Länder support the National Programme through their own programmes, specific to the individual Länder, or through individual activities in other existing programmes.

1 [http://www.genres.de/fileadmin/SITE\\_GENRES/download/docs/StrategiepapierAgrobiodiversitaet\\_deutsch.pdf](http://www.genres.de/fileadmin/SITE_GENRES/download/docs/StrategiepapierAgrobiodiversitaet_deutsch.pdf)

2 <http://www.globalplanofaction.org/id/gpa>

The National Programme accomplishes the following:

- Information about the significance, the occurrence, and the state of conservation of the respective genetic resources is obtained, collated, consolidated, assessed and put together into an overall picture serving as a basis for making decisions,
- Activities are developed that need impetus and backing and are aimed at conserving and sustainably using genetic resources,
- Institutional, personal and financial resources are pooled together;
- The crucial players are brought together from public administration, research and the larger environment in society as a whole.



Blossoming field margin

Taking the international and national requirements as the starting point, particularly BMELV's strategy for agricultural biodiversity, the following are the essential goals of the National Programme for the Conservation and Sustainable Use of Plant Genetic Resources of Agricultural and Horticultural Crops:

- **Securing resources:** to conserve, *in situ* und *ex situ*, the diversity of the wild-growing and cultivated plant genetic resources over the long term, in a scientifically-secured and cost-efficient way;
- **Preserving ecosystems:** to contribute to conserving and restoring ecosystems shaped by agricultural and horticultural activity, including ecosystems devoted to the cultivation of fruit and to grassland;
- **Using diversity:** to make plant genetic resources usable to an increased degree, by employing suitable measures, e.g. by characterising, evaluating, documenting, opening up new developments in terms of plant cultivation, and through educational and public relations work (among other activities);
- **Diversifying cultivation:** to use commercially and sustainably a greater diversity of species and varieties of agricultural and horticultural crops (including ornamental plants) in Germany;
- **Stating and clarifying areas of formal responsibility:** creating greater transparency in terms of the distributed areas of competence and formal responsibility, between the Federal Government, the Länder and the municipalities, as well as the organisations and institutions involved in this area of activity, with regard to conserving and using plant genetic resources; and
- **Cooperating nationally and internationally:** Using and actively promoting synergies which can emerge from strengthened cooperation at national, transnational-regional and international level.



Variety of beans

## 2 Significance, endangerment and use of plant genetic resources

### 2.1 Definition of terms

For the terms used in this National Programme, the definitions of terms applied are those used in the context of the *International Treaty on Plant Genetic Resources for Food and Agriculture* or respectively the *Convention on Biological Diversity*.



**Ecosystem** means a dynamic complex of plant, animal and micro-organism communities and their non-living environment, interacting as a functional unit.

**Biological diversity** means 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.

**Genetic resources** means genetic material of actual or potential value.

**Genetic material** means any material of plant, animal, microbial or other origin, which contains functional units of heredity.

**Plant genetic resources for food and agriculture** means any genetic material of plant origin of actual or potential value for food and agriculture.

**Ex situ conservation** means the conservation of plant genetic resources for food and agriculture outside their natural habitat.

**In situ conservation** means 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 plant species – in the surroundings where they have developed their distinctive properties.

**Sustainable use** means 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.



**On-farm management**, as a special form of *in situ* conservation, is the conservation and further development of locally or regionally-adapted so-called “regional varieties”, in the environment in which they have developed their particular characteristics, i.e. in the agricultural operation in the broader sense.

**Regional varieties** are populations or clones within one species of a given cultivated plant, defined by the reproducible distinctness of their characteristics, and usually comprised of several varieties deviating from one another morphologically or physiologically, which adapt themselves on an ongoing basis to the natural environmental conditions of their region.

**Conservation varieties**, as defined in the Seed Trade Act (SaatG), are varieties of agricultural species and vegetable species which were traditionally planted in certain areas (regions of origin), are adapted to the natural local and regional environmental conditions, are threatened by genetic erosion, and are significant in terms of the conservation of plant genetic resources.

**Amateur varieties**, as defined in the Seed Trade Act (SaatG), are varieties of species of vegetable which are without value *per se*, in terms of being cultivated for commercial purposes, and which were cultivated for use under particular conditions in terms of climate, soil or agricultural technology.

## 2.2 Significance

Of land use in Germany, somewhat more than half of the total is devoted to agriculture – our cultivated landscapes characterised by agricultural activity. The cultivated plants planted or used there have a huge economic significance due to the products that they create; their use offers food, employment and income to many people in Germany. Cultivated landscapes are of much ecological importance, as they account for such an extensive area as habitats for plants and animals.

The bulk of the genetic diversity of our crops grown today emerged due to an ongoing selection process and further development within the context of agricultural production; the diversity that emerged as a result, in the form of adapted species and varieties of cultivated plants, and also in terms of knowledge about cultivating, propagating and using plants, thus also represent a part of our cultural heritage.

Beyond the current economic use, and because of the capacity to pass on characteristics through heredity, the diversity of used and usable plants also constitutes a valuable resource for future use and a basis for innovations and further economic activities. In addition, adaptations to changed framework conditions, such as climate changes or changes in demand, can require recourse to plant genetic resources. Diversity is a fundamental prerequisite for future uses and

for progress in plant breeding. Biological diversity that has been lost cannot be reproduced. It is for this reason that what is particularly needed is the use of preventive care.

Beyond this, cultural and aesthetic values must be taken into account. Among ornamental plants the last-named factors have also attained major direct economic significance. Traditional species or old varieties of cultivated plants provide evidence of the cultural achievements of earlier generations and the historical development of agriculture and horticulture in a region. Traditional forms of the agriculturally-based cultivated landscapes also have a particular value in terms of experience and recreation, which in turn attains economic significance as a location factor, included in the term “diversification of agriculture and forestry”.



Cultivating a range of salad varieties

## 2.3 Status and endangerment

The initial status with regard to condition and degree of endangerment of cultivated plants used in agriculture and horticulture, as well as for wine-growing, is described in BMELV's **strategy for agricultural biodiversity**. Further information on agricultural crops, plants on grassland, vegetables, cultures of fruit, ornamental plants, special cultures and potentially usable wild plants can be found in the second **National Report on Plant Genetic Resources for Food and Agriculture in Germany**, published in 2008<sup>3</sup>. The National Reports also served as the basis for the Second Report on the State of the World's Plant Genetic Resources for Food and Agriculture, published by the FAO<sup>4</sup>.

Even though some species have been able to recover because of targeted conservation activities, as a whole the diversity of species being used, and partly also the genetic diversity within the species, are starkly in declining. The decline has coincided with an intensification of agriculture, which is characterised by regional differences, and the abandonment of plant breeding in low-yield locations. The plan is that, in the future, the endangered status of native diversity of crops is to be better documented, primarily through the further development of the "Red List of Endangered Native Crops" (see Chapter 4.2.1.1.).

Almost a third of commercially-managed agricultural area is accounted for by grassland. With its diversity of species, it ranks among the most valuable agrarian ecosystems, thus providing valuable services as an ecosystem, as well as contributing to agricultural production. On intensively-used grassland, as elsewhere, there is a decline in the richness of species. In order to obtain information which is as comprehensive as possible about the richness of species in grassland locations, in the first instance it is necessary to determine corresponding indicator species, in order to then decide upon a method of obtaining data to identify the various forms of grassland.

## 2.4 Conservation of plant genetic resources

Plant genetic resources for food and agriculture are conserved in two fundamentally different ways which complement one another: *ex situ* and *in situ* conservation. In Germany, *ex situ* conservation takes place primarily in genebanks, Botanical Gardens and other institutions. While the work in the Botanical Gardens primarily places global diversity of species in the forefront for research and training purposes, the genebanks give priority to the variability within our crop plants. Among the German genebanks, Germany's Central Genebank for Cultivated Plants, at the Leibniz Institute of Plant Genetics and Crop Plant Research (IPK), manages a rich collection of species: this collection includes more than 3,200 species, although here also, in relation to the quantity of samples, the collection's point of emphasis is on a few agriculturally-significant species (above all, cereals). This genebank ranks among the largest collections worldwide.



Forking larkspur (*Consolida regalis*): a potentially usable wild plant for food and agriculture (WEL)

3 [http://www.genres.de/fileadmin/SITE\\_GENRES/downloads/schriftenreihe/agrobiodiversitaet\\_band\\_29.pdf](http://www.genres.de/fileadmin/SITE_GENRES/downloads/schriftenreihe/agrobiodiversitaet_band_29.pdf)

4 <http://www.fao.org/docrep/013/i1500e/i1500e00.htm>



**Blossoming meadow of scattered fruit-trees**

As the conservation of some cultures, such as fruit, wood and shrubs, and ornamental plants, is not within the scope of activities of the IPK genebank, further specialised genebanks or respectively networks of genebanks need to be established (see Chapter 4.1). Supplementing this, the Botanic Gardens are also available for the conservation of genetic resources; they can simultaneously preserve old varieties and also wild species and wild forms of cultivated species, both in their natural habitat and also *ex situ*. Yet conservation initiatives and other institutions, including private individuals maintaining specialised collections with only a few species or even only one, can be brought into these conservation activities. For the purpose of better coordinating these collection activities, infrastructures of conservation are currently being established in the form of networks of genebanks, or respectively they are being extended (for further information see [www.genres.de](http://www.genres.de)).

Traditionally, protection and conservation *in situ* act as the main focus of activity in nature-conservation work. The species remain subject to the dynamic processes of evolution within their ecosystems. This safeguards the necessary adaptation to changing environmental influences by means of natural selection.

With more than 2,800 species, wild plants related to our species of crops (*crop wild relatives* – CWR) plus actually or potentially usable wild species comprise a considerable proportion of our native flora (approx. 3,500 species). The corresponding German term means “wild plants for food and agriculture”. CWR make an important contribution to the extension of the gene base, thus acting as a valuable source of new characteristics for plant cultivation. Today sustainable agricultural and horticultural plant production requires high-performance healthy varieties with distinctive quality characteristics and a high degree of resistance to plant diseases and pests.

A particular form of *in situ* conservation is *on-farm* management. Conservation initiatives, but also some organic-farming businesses, cultivate old regionally-adapted varieties (so-called “regional varieties”). In terms of conserving horticultural crop plants and special cultures, traditional use in gardens can similarly be very important.

The conservation and sustainable use of genetic resources ranks among the important tasks for the future for Federal and Länder Governments in Germany.

## 3 Political and legislative framework

### 3.1 International level

#### 3.1.1 Convention on Biological Diversity

The *Convention on Biological Diversity – CBD*, adopted by the community of nations in 1992 in Rio de Janeiro, obliges each contracting state to undertake long-term conservation and sustainable use of biological diversity on its respective sovereign territory. It also contains provisions concerning access to genetic resources and a share in the benefits accruing from the use of these resources (see also Chapter 3.3.1 on this). Germany has been a Party to the CBD since 1993 (Federal Law Gazette II, 1993, p.1741).

An important success in the CBD process came in 2002, with the adoption of the Bonn Guidelines concerning access to genetic resources and benefit sharing. With this endorsement of the so-called Nagoya Protocol at the 10th Conference of the Parties, fully taking into account existing international legislation, the foundations were laid for future rulings with regard to access and benefit sharing.

Beyond this, the *Global Strategy for Plant Conservation (GSPC)*, adopted within the context of the CBD, is also of importance for the protection, the conservation and sustainable use of plant genetic resources. It serves as an instrument for reaching the goal set in 2010 (significant reduction in the loss of biodiversity), which was adopted in 2002 by the Heads of State and Government on the occasion of the World Summit on Sustainable Development. All Parties to the CBD are requested to take the GSPC into account in formulating national strategies and programmes. At the 10th Conference of the Parties to the CBD in October 2010 in Nagoya, Japan, a revised GSPC was adopted. The GSPC encompasses 16 specific goals in 5 areas of



Delegates negotiate the international framework for conservation and sustainable use of plant genetic resources

activity: (I) recording and documentation, (II) conservation, (III) sustainable use, (IV) promoting education about and awareness of the diversity of plant life and (V) creation of specialist capacity for its conservation. In a research and development project of the Federal Agency for Nature Conservation (BfN) with the Botanical Gardens of the University of Bonn (2005–2008), proposals were drawn up for implementation requirements with regard to GSPC commitments in Germany. Since the end of the project, the gap analysis and the formulation of priorities for action, produced within the framework of this project, have been supporting the implementation of individual goals by involved parties in Germany.

Another foundation for the work is the detailed requirements of the *European Plant Conservation Strategy – EPCS*. The EPCS was developed by *Planta Europa*<sup>5</sup> and by the Council of Europe and places the GSPC's goals into a European context. It includes 42 clear goals for Europe, with which the 16 goals defined in the GSPC were to be implemented by mid-2010. In 2007 the EPCS was checked again and further harmonised with the GSPC.

5 "Planta Europa" is a network of independent government and non-government organisations working together for the protection of European flora ([www.plantaeuropa.org](http://www.plantaeuropa.org)).



The new European Strategy (*European Strategy for Plant Conservation – ESPC*) is in force from 2008 – 2014 inclusive, supporting each of the 16 goals of the GSPC by means of specific European goals which, in some instances, are of great relevance for this Specialist Programme (e.g. ESPC Goal 9.1: *Establishment of 25 European crop wild relative genetic reserves covering the major hotspots of species and genetic diversity*). The implementation of the ESPC is coordinated by Planta Europa.

### 3.1.2 International Treaty on Plant Genetic Resources for Food and Agriculture

At international level, the most important agreement for the conservation and use of plant genetic resources for food and agriculture – the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR) – came into force in 2004 (cf. [www.planttreaty.org](http://www.planttreaty.org)). The Treaty has been ratified as a German Federal law requiring the consent of the Bundesrat.<sup>6,1</sup>

The ITPGR contracting parties undertake an obligation to conserve plant genetic resources for food and agriculture over the long term and to use them in a sustainable way; they also commit themselves to engage in mutual support and international cooperation. A central element of the ITPGR is a Multilateral System (MLS), from which plant genetic resources are made available for use subject to less stringent conditions, with the help of a “Standard Material Transfer Agreement (SMTA)”. According to the ITPGR, via this SMTA and subject to the respective conditions, either obligatory or voluntary payments are made into the ITPGR’s so-called “Benefit Sharing (BS) Fund”. From this resource, the *BS Fund* promotes projects in developing countries and transition economies, insofar as the countries in question are ITPGR contracting parties.

The ITPGR also recognises *Farmers’ Rights* by acknowledging the contribution that locally-born and locally-established communities and farmers have made and still make to the conservation and development of plant genetic resources.

Germany ratified the ITPGR in 2004 and its implementation at national level is well advanced by now. BMELV is the leading ministry and National Focal Point for matters relating to the Treaty. The relevant parties involved were urged to make plant genetic resources available for the MLS and to use the SMTA for the submission of material from these plant genetic resources. Improving the availability of information, a German-language version of the SMTA was produced, in coordination with Austria and Switzerland (it is solely the English text version that has legal validity), and made available with further explanatory information, on BMELV’s internet site (and elsewhere). In all, German institutions have introduced circa 108,000 genebank samples to the MLS since 2008. The MLS samples are marked accordingly in the National Inventory for Plant Genetic Resources (PGRDEU)<sup>6</sup>, so that targeted online search is possible among the material made available from Germany for the MLS.

Continued support for the ITPGR is an essential element of the German strategy for agricultural biodiversity.



6 <http://pgrdeu.genres.de/>

6.1 Gesetz zu dem befristeten Vertrag vom 3. November 2001 über pflanzengenetische Ressourcen für Ernährung und Landwirtschaft, BbBI II 2003 906 (Act pertaining to the fixed-term treaty, dated 3 November 2001, relating to plant genetic resources for food and agriculture, Federal Law Gazette II, 2003, 906).

### Commission on Genetic Resources for Food and Agriculture at the FAO

A leading role in the international cooperation on genetic resources is played by the FAO's Commission on Genetic Resources for Food and Agriculture (CGRFA). This organisation is an inter-state government commission advising the FAO conference in questions of agricultural biodiversity, including genetic resources for food and agriculture. The CGRFA was founded in 1983 and currently has 172 states plus the EU as its members. It bears formal responsibility for genetic resources of crops, livestock, forestry plants, aquatic genetic resources, micro-organisms and invertebrates, as well as cross-functional questions such as access to genetic resources and the just sharing of benefits, biotechnology for securing and using genetic resources, monitoring and indicators or ecosystem-based approaches.

The CGRFA has a rolling 10-year *Multi-Year Programme of Work (MYPOW)* regarding the genetic resources for food and agriculture, across all areas of activity. It was also within this framework that the Second Report on the State of the World's Plant Genetic Resources for Food and Agriculture was produced; likewise, the Global Plan of Action for Conservation and Sustainable Use of Plant Genetic Resources for Food and Agriculture was revised on this basis. The Global Plan of Action is the means for coordinating worldwide approaches to conservation and for agreeing superordinate goals. The completion of the third Report on the State of the World's Plant Genetic Resources is scheduled for 2019. Germany is actively participating in the work of the CGRFA.

#### 3.1.3 Global Crop Diversity Trust

The *Global Crop Diversity Trust (GCDT)* was founded in 2004 as an independent international organisation (cf. [www.croptrust.org](http://www.croptrust.org)). It has the task of ensuring the long-term conservation and availability of plant genetic resources, in order to support sustainable agriculture and security of the food supply. To this end, it pursues internationally-agreed and scientifically-based strategies for the conservation of plant genetic resources, aimed at building up an efficient global *ex situ* system of conservation for important types of



Annual Report of the Global Crop Diversity Trust

crops. International cooperation which is improved accordingly, as well as an enhancement of efficiency and quality in *ex situ* conservation, will also benefit those conserving and using these plant genetic resources within Germany.

Above all, these strategies are coordinated with the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR) and the FAO Commission for Genetic Resources. As the Trust thereby takes on tasks within the framework of the ITPGR, it is an important part of the ITPGR's financing concept.

In accordance with BMELV's strategy for agricultural biodiversity, as well as the National Programme of 2002, Germany contributed a total of 7.5 million Euro to the start-up capital of the GCDT in the years 2006–2010. German experts also led the work on drawing up the global conservation strategy for oats (*Avena*) and participated in drawing up the strategy for strawberries (*Fragaria*).

## 3.2 European level

### 3.2.1 EU Agricultural Policy

The framework conditions set up for sustainable agriculture through the **Common Agriculture Policy** of the EU (CAP) have been significantly improved in recent years. With the CAP's so-called "health check" in November 2008, the EU Council of Agriculture Ministers adopted a resolution to give stronger sup-

port to agriculture in mastering the new challenges, including climate change as well as biodiversity issues, and to further develop the resolutions adopted in the agricultural reform in 2003. The agri-environmental measures are an essential instrument in helping to attain these CAP goals. The legislative foundation for funding the agricultural activities is the Council Regulation No. 1698/2005 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD Regulation). This is implemented via corresponding programmes of the German Länder (Federal States). Within the framework of the “Joint German Government and Länder Programme on Improving Agriculture Structures and Coastal Protection” (GAK), the Federal Government also supports the agri-environmental measures. Beyond this, the Länder implement specific funding measures on the subject of nature conservation based on treaty commitments.

Alongside this, there are various **EU Action Plans** with relevance for the conservation of agricultural biodiversity<sup>7</sup>. To continue the Action Plan of 2006 for halting the loss of biodiversity, the European Commission has proposed a biodiversity strategy for the EU up to the year 2020 (in its Communication of 3 May 2011).<sup>8,1</sup>

Based on the Regulation that calls into being a **Community programme on the conservation, characterisation, collection and utilisation of genetic resources in agriculture** (Council Regulation (EC) No 870/2004), appropriate projects have been funded throughout the EU for ten million Euro since 2004. The Regulation, which has de facto expired now that the funds are used up, is being evaluated in 2012. Together with other Member States, Germany is advocating a continuation, subject to financial resources being replenished accordingly.

For the continuation of the CAP until 2020 what is taking shape is, as before, a twin-pillared policy. The policy’s overall intention is for the CAP to make an increased overall increase to the goals of the strategy “*Europe 2020*” and to environmental goals. For this,

what the European Commission is demanding is a “greener” first pillar, according to which agricultural direct payments are only granted in the full amount if the farmers implement certain environment-related measures. For the second pillar, the Commission is demanding that efforts are directed to the following points of emphasis: competition and innovation, climate change and the environment<sup>8</sup>. Within this the Commission also includes, among other things, the conservation and improvement of ecosystems dependent on agriculture and forestry. This will result in consequences for funding in the area of agro-biodiversity and thus also for the framework for parts of the National Programme; however, the extent of this is not yet discernible.

The European Commission is making available around 60 bn. Euro for research and innovation, in the period 2007–2013; of this, around 50 bn. Euro are devoted to the 7th Framework Programme for Research, by now the world’s largest programme of funding for research. Opportunities for funding exist within the framework of the regular invitations to tender, primarily in the specific programme “Cooperation” (area of research: food, agriculture, fisheries and biotechnology) as well as in the specific programme “Capacities” (research infrastructures).



**For fodder plants and many other cultivated plants used in arable land and in gardens, grassland managed on the basis of extensification serves as the habitat for the wild species related to them.**

- 7 Mitteilung der Kommission an den Rat und das Europäische Parlament – Aktionsplan zur Erhaltung der Biologischen Vielfalt in der Landwirtschaft /\* KOM/2001/0162 endg. \*/ und MITTEILUNG DER KOMMISSION EINDÄMMUNG DES VERLUSTS DER BIOLOGISCHEN VIELFALT BIS ZUM JAHR 2010 – UND DARÜBER HINAUS, KOM(2006) 216 endg. (7: Communication from the Commission to the Council and the European Parliament. – Action plan for the conservation of biodiversity in agriculture. COM/2001/0162 final. and COMMUNICATION FROM THE COMMISSION. HALTING THE LOSS OF BIODIVERSITY BY 2010 – AND BEYOND. COM (2006) 216 final).
- 8 Mitteilung der Kommission an das Europäische Parlament, den Rat, den Europäischen Wirtschafts- und Sozialausschuss und den Ausschuss der Regionen – Die GAP bis 2020: 8 Nahrungsmittel, natürliche Ressourcen und ländliche Gebiete – die künftigen Herausforderungen, KOM (2010) 672/5 (8: Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – The CAP towards 2020: Meeting the food, natural resources and territorial challenges of the future. COM (2010) 672/5).
- 8.1 (vollständige Bezeichnung) (complete designation )



Meadow with blue blossoming lupins

### 3.2.2 European Cooperative Programme for Plant Genetic Resources

In order to facilitate the long-term *in situ* and *ex situ* conservation of plant genetic resources in Europe, based on a division of labour, and to improve their use in Europe, the European Cooperative Programme for Plant Genetic Resources (ECPGR) was called into being. In essence, it is founded upon the cooperation of institutions in what are currently 42 Member States, financing itself by their contributions. Further goals of the ECPGR are the funding of cooperation at all levels of operations (public institutions, conservation initiatives, plant cultivation companies, etc.), also in the form of joint projects and publicity work. The ECPGR thereby operates as the central European platform for technical cooperation within Europe and with other regions, or respectively with other regional and international initiatives or programmes.

The ECPGR is subdivided into species-specific or topic-specific networks. The work within the networks is done by working groups and project groups. German representatives participate in all working groups and project groups. In addition, the central European

crop-specific databases for *Avena*, *Beta*, *Hordeum*, *Minor Leafy Vegetable*, *Poa* and *Vitis* are currently being operated by German institutions.

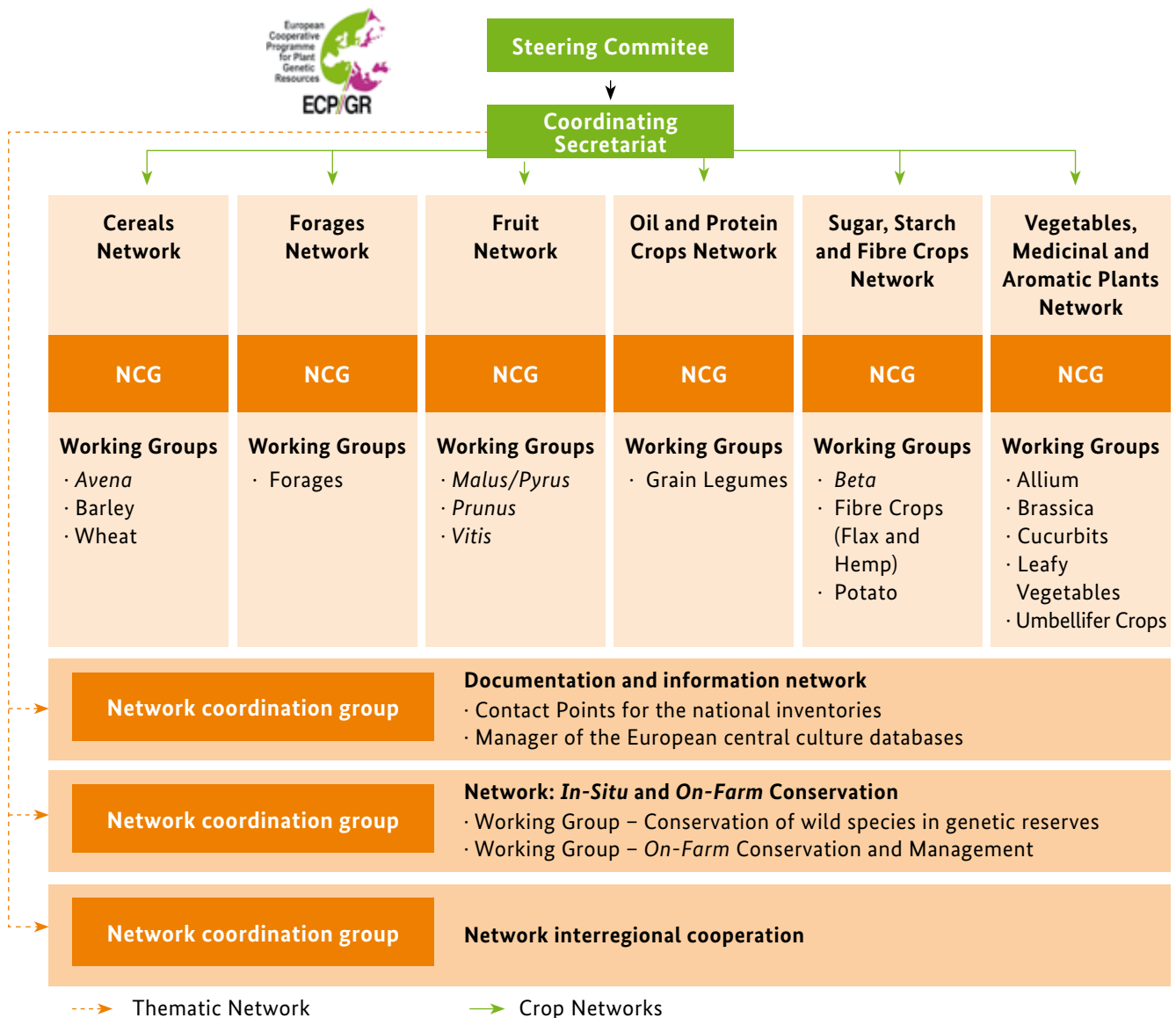
German involvement in the cooperation programme is coordinated by BEKO's "ECPGR" group of experts. It prepares Germany's national contribution to forthcoming meetings, reports on results and contributes to the further development of the ECPGR. This group of experts also advises BEKO with regard to species-specific and topic-specific questions.

The further development of the ECPGR is one of the goals of BMELV's biodiversity strategy for agriculture. For that reason, and within the framework of ECPGR cooperation, Germany supports the implementation and further development of the European Plant Genetic Resources Search Catalogue – EURISCO. EURISCO is an internet-based search catalogue, supplying information on *ex situ* collections throughout Europe. It currently includes so-called passport data, i.e. information unambiguously describing a sample (e.g. identity in terms of species, name of the variety, country of origin, institution conserving the item, etc.) for more than 1.1 million samples of plant diversity, being conserved in approx. 240 European institutes in 38 countries. One of EURISCO's main elements is a network of national focal points, each with formal responsibility for its respective national inventory and also for the data flow between the national inventory and EURISCO. Each country has full responsibility for the availability and correctness of its own data and also for the regular updating of the national inventory's data in EURISCO. At present, 40 countries have nominated a National Focal Point and 31 national inventories have been integrated into EURISCO. The conditions for the cooperation were stated in an agreement concluded between *Bioversity International*<sup>9</sup> and the National Focal Points for the national inventories: in Germany this is the BLE's Information and Coordination Centre for Biological Diversity. A further important task of the ECPGR, also with key support from Germany, is the build-up of the "European Genebank" AEGIS (*A European Genebank Integrated System*), the objective of which is to set up a more efficient arrangement for the conservation of plant genetic resources in Europe.

9 Bioversity International: international research organisation pursuing agricultural biodiversity goals, which has its offices in Maccaresse near Rome, Italy.



## Organisational structure of the ECPGR with its networks, Working Groups and Task Forces of Phase VIII (2009–2013)



### 3.3 National level

The conservation and sustainable use of genetic resources for food and agriculture is a task of the Federal Government, one which cuts across ministries' dividing lines of responsibility and is of much significance. As a contracting party to the Convention on Biological Diversity and the International Treaty on Plant Genetic Resources for Food and Agriculture, Germany undertakes an obligation to conserve these resources over the long term and to use them in a sustainable way. Within the Federal Government, the formal responsibility for conservation and sustainable use of plant genetic resources of agricultural and horticultural plants lies with BMELV.

The formulation of BMELV's strategy for the conservation and sustainable use of biodiversity for food, agriculture, forestry and fisheries (abbreviated: strategy of agricultural biodiversity) placed the conservation of genetic resources into the context of a broader overarching concept for conserving agricultural biodiversity and using it sustainably. This strategy supplements the national strategy adopted by the Federal Cabinet for the conservation and sustainable use of biological diversity. The significance of genetic resources for food and agriculture is also emphasised in the sustainability strategy of the Federal Government.



Regional products are sold at weekly markets on a very widespread basis.

As a cross-functional task, the conservation of plant genetic resources also comes within the **remit of several areas of politics and the law**, above all those of agricultural policy, environmental policy, and nature-conservation policy. Yet research policy is also of great significance for the conservation and sustainable use of genetic resources.

Within Germany's federal system, the **Federal Government is formally responsible** for the conservation and use of genetic resources to the extent that it makes avail of its legislative competence, within the framework of the concurrent levels of legislation, for the promotion of agricultural and forestry production and also for safeguarding the food supply. Among other things, this encompasses the Seed Trade Act (*Saatgutverkehrsgesetz*) for the agricultural species of crops, together with the regulations issued in this connection, governing the marketing of seed and planting stock and the authorisation of plant varieties. The rulings aimed at the protection of intellectual property also remain of relevance (e.g. protection of plant varieties, see Chapter 3.3.2). The Federal Government's formal responsibility for foreign relations also generates coordination tasks in relation

to EU programmes or international programmes and agreements. Formal responsibilities also emerge from the joint funding of institutions and research projects of nationwide significance and cross-regional significance, by the Federal Government and the Länder.

For implementing the activities aimed at conservation of plant genetic resources, including research, education and training, as well as the regional structuring of the political framework predetermined by the EU and the Federal Government, it is the **Länder** that are responsible in Germany. Obligations involving domestic application of international commitments continue to arise for the Länder, in connection with conservation and sustainable use, from the International Treaty on Plant Genetic Resources for Food and Agriculture, as well as from the Convention on Biological Diversity. At the same time, the Länder are also involved in formulating these framework conditions; this includes developing additional measures of their own. Representatives of the Länder policy officers for arable and plant farming, extensification, horticulture, wine-growing, and the Länder working group on nature conservation are all active within BEKO, to accompany the National Programme in a representative capacity.

BMELV supports and promotes the implementation of the National Programme, (among other things) by providing the necessary data and information in the context of **data surveys**, status reviews and non-scientific surveys on the topic of biological diversity. The goal is to record genetic resources, collate them into an inventory, and document them: it also includes monitoring developments in stock levels of genetic resources, and generating other foundations of information in this area of knowledge. For awarding the orders, the BLE conducts tendering procedures, which (where applicable) are published in the Federal Gazette and on its website ([www.ble.de](http://www.ble.de)).

The objective of **model and demonstration projects** (MuD) conducted on behalf of BMELV is to develop and implement innovative concepts serving as role models and, in the process, to reduce any difficulties that arise in the conservation and sustainable use of genetic resources in Germany. The basis for the funding of a project as an MuD is BMELV's directive on funding of model and demonstration projects in the area of conservation and innovative sustainable use of biodiversity<sup>10</sup>.

10 [http://www.ble.de/DE/03\\_Forschungsfoerderung/04\\_BiologischeVielfalt/MuD-Vorhaben/MuD-VorhabenBV\\_node.html](http://www.ble.de/DE/03_Forschungsfoerderung/04_BiologischeVielfalt/MuD-Vorhaben/MuD-VorhabenBV_node.html)

An important instrument for better harmonising the conservation and the promotion of biodiversity with agricultural systems of use is the **agri-environmental measures of the Federal Government and the Länder**<sup>11</sup>. Among other things, these measures endorse the conservation of varied crop rotations, the planting of regionally adapted varieties, the cultivation of groups of scattered fruit trees, and extensification of grassland. The Länder offer a wide-ranging spectrum of funding measures, which was specially adapted to the particular regional characteristics and requirements of rural development in the respective Länder.

In 2008, the Federal Government and the Länder adopted into the framework plan, made for the **Joint Programme** of “Improvement of the Agricultural Structure and of Coastal Protection”, a new offer of funding for the conservation of genetic resources in agriculture. Beyond this, the Länder can also provide funding for the farming of endangered native crops in the context of the development programmes specific to their respective Land and support it through the build-up of regional Competence Centres. In both areas of implementation, the Federal Government is required to exercise coordination functions. The Länder can also bring the topic into focus through their publicity work on plant genetic resources, in the following contexts: testing regional varieties, the formal recognition of seed, and also basic and advanced professional training (in the areas of agriculture, horticulture and the environment).

### 3.3.1 Access to plant genetic resources

Access to plant genetic resources for food and agriculture affects both *in situ* resources (natural wild plants or related wild species of the cultivated plants), *on-farm* stocks (regional varieties) or *ex situ* stocks (accessions of wild plants and crops in genebanks or plant collections for research and innovation).

According to current **German national law**, it is a point of principle that the regulation of access to plant genetic resources for food and agriculture depends on the owner of the resources. These can be both in private ownership and also be under public ownership. Usually, the owner of the relevant area of land or water is deemed to be the owner of the biological or respectively genetic resources found to



**Genebanks secure the long-term conservation of plant genetic resources**

be present there. Generally access to plant genetic resources located on private property (*in situ* or *ex situ*) is thus a matter at the owner’s discretion.

Like most EU Member States, Germany – a Party to the **CBD** since 1993 – has no legislative provisions of its own for separately resolving the issue of access to genetic resources on its sovereign territory in a way consistent with the CBD. Therefore in Germany everyone is permitted in principle to gather plants growing *in situ*, subject to conformity with the property laws referred to above, with nature conservation and species protection, and also with the stipulations on health of plants and other particular protective rights. In order to make available sufficient and transparent information about the provisions governing access and benefit-sharing within the framework of the CBD, Germany has nominated a national information point and set up an internet site to provide information about access and benefit-sharing (<http://www.biodiv-chm.de>).

At international level, the **International Treaty** has acted as another important regulation regarding access to plant genetic resources for food and agriculture, since it took effect in 2004. In Germany, the ratification of the International Treaty brought about an effective and transparent process for facilitating access to 35 agricultural main crops (e.g. oats, barley and potatoes) and to 29 grassland species / genera (e.g. leguminosae and grass fodder).

11 [www.bmelv.de](http://www.bmelv.de)



Testing germs in filter trays

A central element is the so-called Multilateral System (MLS) for Access and Benefit Sharing. The International Treaty's contracting parties bring plant genetic resources of crops, listed in Annex I of the International Treaty and which they administer and monitor, into this MLS. For material within the MLS, uniform and easier conditions of access are in force, insofar as the material is used for purposes of research, plant cultivation and vocational training for the food and agriculture sector. A Standard Material Transfer Agreement (SMTA), adopted by the controlling body of the International Treaty in 2006, forms the contractual basis for any issuing of material from the MLS and determines the details regarding access and benefit sharing. By mid-2008, the SMTA had been introduced by two organisations: the Federal Central *Ex situ* Genebank of the Leibniz Institute for Plant Genetics and Crop Plant Research (IPK), (based in Gatersleben), and also the fruit genebank at the Institute for Breeding Research on Horticultural and Fruit Crops: the latter is part of

the Federal Research Centre for Cultivated Plants – Julius Kühn Institute (based in Dresden-Pillnitz); the two organisations have made approx. 108,000 samples available for the MLS. The resources of the German Genebank for Fruit Crops are also made available based on use of the SMTA.

For Botanical Gardens, stipulations governing access to genetic resources fundamentally influence the exchange of planting stock between the gardens and international access to wild species. To implement the CBD stipulations, a network was drawn up by a number of Botanical Gardens – the International Plant Exchange Network (IPEN). The network enables its member gardens to transfer living planting stock for non-commercial use among one another in a simplified way, subject to compliance with CBD stipulations. For this purpose, a code of conduct was elaborated, obliging the members to use the planting stock solely for non-commercial purposes.

Beyond this, material for commercial use is issued solely if the potential user has obtained the consent of the country of origin and can credibly demonstrate this. Through the introduction of IPEN numbers, accompanying the planting stock circulated within IPEN, and which the participating gardens store in their databases, the plant's country of origin always remains traceable; that way, in the event of a commercial use of the genetic resources an appropriate share of the benefit gained can at all times be passed on to the country of origin. Thus, through the network for plant exchange the observance of the CBD stipulations is monitored and, at the same time, the system serves as a means of facilitating access to planting stock for the important work undertaken by Botanical Gardens. IPEN currently counts 46 Botanical Gardens in Germany among its members.

Access to plant genetic resources can be restricted due to laws governing intellectual property. German patent law does explicitly rule out a **patenting** of varieties of plants and breeds of animals. Nevertheless, patents can indeed be issued for inventions, "the subject matter of which is plants or animals, if the implementation of the invention is technically not restricted to a certain variety of plant or breed of animal". Thus the possibility exists for a protection of property which can be derived from the patenting of a production process (invention) for cultivated products (plants with cells or genes exhibiting particular characteristics); this protection of property also encompasses subsequent generations. Thus, under certain circumstances, genetic resources can be beyond the scope of unrestricted use.

For the broad spectrum of cultivated plants to remain available for all breeders and farmers and not be constricted by bio-patents, Germany has decided in favour of the protection of intellectual property pertaining to newly-cultivated plant varieties, in accordance with the UPOV Convention<sup>12</sup>. The German Plant Varieties Act, like the corresponding EU Regulation on plant variety, promotes the necessary progress in breeding and has as its goal the balancing of the interests of breeders and farmers. The German Plant Varieties Act enables a plant breeder to recoup the costs incurred by the breeder over many years for the cultivation of a variety, e.g. via licence fees. However, for certain species, farmers may use the seed or plant-

ing stock of a protected variety, obtained in their own operations, for replanting ("farmers' privilege"). Nevertheless, in this instance they are obliged to pay the party who is owner in terms of plant-variety protection a so-called fee on farm-saved-seed: this is usually significantly lower than the licence fee charged for certified seed. Unlike in the case of so-called bio-patenting, other breeders can use varieties of plant protected in terms of law on protection of plant varieties, for their own cultivation activities (so-called "breeder privilege").

This also means that original genetic resources which are crossed into new varieties of plants, for instance, are not placed beyond third-party use by protection of plant varieties. Variety protection has a 25-year duration in the case of most species of plants; it is 30 years in the case of hops, potatoes, grapevines, and species of trees.

### 3.3.2 Legislative framework for marketing seed and planting stock

When marketing seed and planting stock, for certain species the Seed Trade Act (short form: "SaatG") must be taken into account. Based on EU Directives relating to seed, the Seed Trade Act, together with the Regulations issued in that regard, regulate the marketing of seed and planting stock and the authorisation of plant varieties. The Seed Trade Act primarily serves the purpose of protecting consumers and of supplying agriculture and horticulture with seed and planting stock from effective, qualitatively high-calibre, healthy varieties. Authorisation is a prerequisite for marketing and commercial sale of seed and planting stock from varieties of agricultural species of plants, grapevines, and species of vegetable. In varieties of agricultural species, the authorisation process also entails characteristics conferring values, such as yield, quality, capacity for resistance, resistance to certain specific dangers, and cultivation characteristics, etc. (regional cultivation value). The authorisation for the varieties is issued for ten years (for a grapevine: 20) and can be renewed again and again, subject to certain prerequisites being fulfilled. In the case of fruit and also species of ornamental plants, an authorisation of a variety is possible; however, this is not currently a prerequisite for trading the product.

12 Internationaler Verband zum Schutz von Pflanzenzüchtungen (UPOV), [www.upov.org](http://www.upov.org) (International Union for the Protection of New Varieties of Plants). [www.upov.org](http://www.upov.org)

A further prerequisite for marketing seed sourced from authorised seed varieties of agricultural species is the official recognition of seed, issued if the physical areas for propagating the seed and the composition of the seed conform to norms predefined in the law governing seed.

For all species not listed in the directory of species associated with the Seed Trade Act (SaatG), no authorisation of the varieties is necessary for the seed to be traded.

In the context of the law governing seed hitherto in force, it was difficult to commercially market seed from old plant varieties, which were either not authorised or no longer authorised in the law on seed-variety protection; this was because, for the most part, these varieties are not able to fulfil the exacting requirements of registration testing (distinctness, uniformity and stability) and provide proof of their regional cultivation value. As such varieties can contribute to the conservation of plant genetic resources in a particular way, the EU issued stipulations on implementation in its law, in the context of the EU directives on seed; these measures facilitate in a targeted way the marketing of varieties of seed and

propagation material which appear to merit conservation as a genetic resource. These EU rulings were implemented in national law in 2009, initially for agricultural species, in a Directive on Conservation Varieties<sup>13</sup>; in December 2010, this was supplemented by stipulations on conservation varieties and amateur varieties of vegetable<sup>14</sup>. This helps to safeguard biological diversity in agriculture and horticulture (vegetable farming). Conservation varieties can be registered in a simplified procedure if they are significant for conservation as a genetic resource. An official recognition of the seed is not necessary as a prerequisite for marketing it; however, the seed must fulfil the same quality requirements as other certified seed does (or respectively standard seed in the case of species of vegetable).

The first conservation varieties (the winter soft-wheat variety “Goldblume” and “Luxaro”; winter rye variety “Likoro”; the potato varieties “Heideniere”, “Ackergold”, “Bamberger Hörnchen” and „Rosemarie”; broad bean “Herz Freya”) have their respective registration by the Bundessortenamt (the Federal Plant Variety Office). Other applications for registration have been submitted. The current status can be viewed on the internet pages of the Federal Plant Variety Office<sup>15</sup>.

In December 2011, a further EU Directive was implemented in national law: this states rules that govern exceptions with regard to marketing of seed mixtures – the so-called conservation-mix directive<sup>16</sup>.

Apart from this, there are other possibilities for propagating and farming old varieties as conservation varieties, without registration, e.g. in contract farming or in the case of greening activities with native grazing mixtures, by means of transferring mown organic material. The EU’s rules governing the trade in seed underwent an evaluation, starting in 2008. The results were assessed in 2011 and are intended to form the basis for a reworking of the European law governing seed.



**Plant genetic resources are an important foundation for research into breeding**

13 Verordnung über die Zulassung von Erhaltungssorten und das Inverkehrbringen von Saat- und Pflanzgut von Erhaltungssorten vom 21. Juli 2009 (BGBl. I S. 2107) (Regulation on the authorisation of conservation varieties and the marketing of conservation varieties of seed and planting stock, 21 July 2009 (Federal Law Gazette I, p. 2107).

14 Vierzehnte Verordnung zur Änderung saatzgutrechtlicher Verordnungen vom 17. Dezember 2010 (BGBl. I S. 2128) (Fourteenth Regulation, amending seed-law regulations, 17 December 2010 (Federal Law Gazette I, p. 2128))

15 [www.bundessortenamt.de/internet30/index.php?id=21](http://www.bundessortenamt.de/internet30/index.php?id=21)

16 Verordnung für das Inverkehrbringen von Saatgut von Erhaltungsmischungen vom 6. Dezember 2011 (BGBl. I S. 2641) (Regulation on marketing seed from conservation mixes, 6 December 2011 (Federal Law Gazette I, p. 2641).

An important role is played by the **EU Directives for propagation material, except for seed, vegetables, fruit and ornamental plants**. Thus, to cite an example, when implementing the Directive concerning marketing of propagation material and plants of fruit species in order to produce fruit (2008/90/EC), the existing possibilities for exception – particularly for conservation of genetic diversity – can be used nationally.

### 3.3.3 Impact of nature-conservation law

The Federal Nature Conservation Act (BNatSchG) also has an impact on the conservation of plant genetic resources for agriculture and food. This law aims at protecting, taking care of and developing nature and landscape in populated and unpopulated areas, in such a way as to safeguard the following on a lasting basis, as the foundations for human life: the effectiveness and functional capability of the balance of nature; the regenerative capability of natural assets, and their capability for use; the plant and animal world; as well as the diversity, uniqueness and beauty of nature and landscape. In order to secure the effectiveness and functional capability of the balance of nature, biological diversity must be conserved and developed. Biodiversity includes the diversity of habitats and communities of life forms, the diversity of species as well as the genetic diversity within species.

In a particular way, the individual categories of reserve and the biotope protection enforced by law serve the aim of conserving threatened species of animals and plants living there, including their genetic resources. The Federal Nature Conservation Act makes particular references to genetic resources for food and agriculture solely with respect to the law's provisions regarding biosphere reserves. The aims of biosphere reserves are the "conservation, development or reproduction of a landscape characterised by established diverse use, and also the diversity of species and biotopes which has grown up there over the course of time; this includes wild forms and earlier cultivated forms of economically used or usable species of animal and plant". Generally speaking, biosphere reserves can be viewed as model areas for the development of sustainable approaches to development at regional level. This provides the basic structure for implementing practice-oriented (primarily) *in situ* and *on-farm* management projects for the conservation and the sustainable use of (plant) genetic resources. Yet it should be noted that for these task areas only limited financial resources are available.



Blossoming field margin with rape

The Directive 43/92/EEC on the conservation of natural habitats and of wild fauna and flora (fauna-flora-habitat – FFH) created a joint legal foundation for the purpose of conserving the European natural heritage and thus the genetic resources to be found in the wild in Europe. The FFH Directive is one of the central instruments with which obligations stated in the CBD regarding *in situ* conservation of biological diversity can be fulfilled. It obliges Member States to set up a coherent European ecological network of special reserves – known as "Natura 2000"; these are home to valuable types of habitat, as well as to rare and threatened / unique species respectively. The Directive requires monitoring of success in the management of nature conservation and includes a supervisory requirement regarding the state of conservation, as well as comprehensive reporting obligations. Currently circa 14 % of the territory of Germany is designated as a protective area as defined by "Natura 2000". Yet this Directive contains no special measures with respect to genetic resources in connection with food and agriculture. However, it does make synergy effects possible, for example within the framework of grassland protection and in the area of *in situ* conservation of crop wild relatives (CWR; German short form: WEL).

## 4 Priority Activities

This Chapter states the priority activities necessary for attaining the goals referred to in Chapter 1 with regard to the Strategy for Agricultural Biodiversity and this National Programme; it describes what has been accomplished to date, and the further measures necessary are indicated.

### 4.1 *Ex situ* conservation

The expansion of *ex situ* conservation is one of the goals in the *National Strategy for Biological Diversity*<sup>17</sup> (particularly Goal B 1.1.4: Genetic diversity of domesticated species and species living in the wild) and in BMELV's strategy of agricultural biodiversity (especially the goal of safeguarding and extending the infrastructure of conservation). This expansion also forms part of the national contribution to (among other things) the Multilateral System of the International Treaty relating to PGRFA, the Global Strategy for Plant Conservation (e.g. GSPC Goal 9 – "Conservation of 70 % of the genetic diversity of crops and of the indigenous and local knowledge associated with this") and to the build-up of the European Genebank AEGIS.

Predominantly, the *ex situ* conservation of plant genetic resources for food and agriculture is an aim pursued by keeping samples of seed and of vegetatively propagated material in collections – so-called genebanks – and partly also in Botanical Gardens. The core task of genebanks is to collect samples and to conserve, characterise, and document them and make them available. While the work in the Botanical Gardens primarily places at its forefront global diversity of species for research and training purposes, in the genebanks priority goes to the variability within species among our native cultivated species. Thus genebanks act as an important foundation for the conservation of diversity, and yet also for plant cultivation and cultivation research. In many instances, cultivation research is a direct constituent part of the spectrum of tasks that genebanks have.

What an appropriate infrastructure of conservation entails is not solely the conservation and expansion of institutions of this nature – and thus the availability of genetic resources – but also the task of obtain-



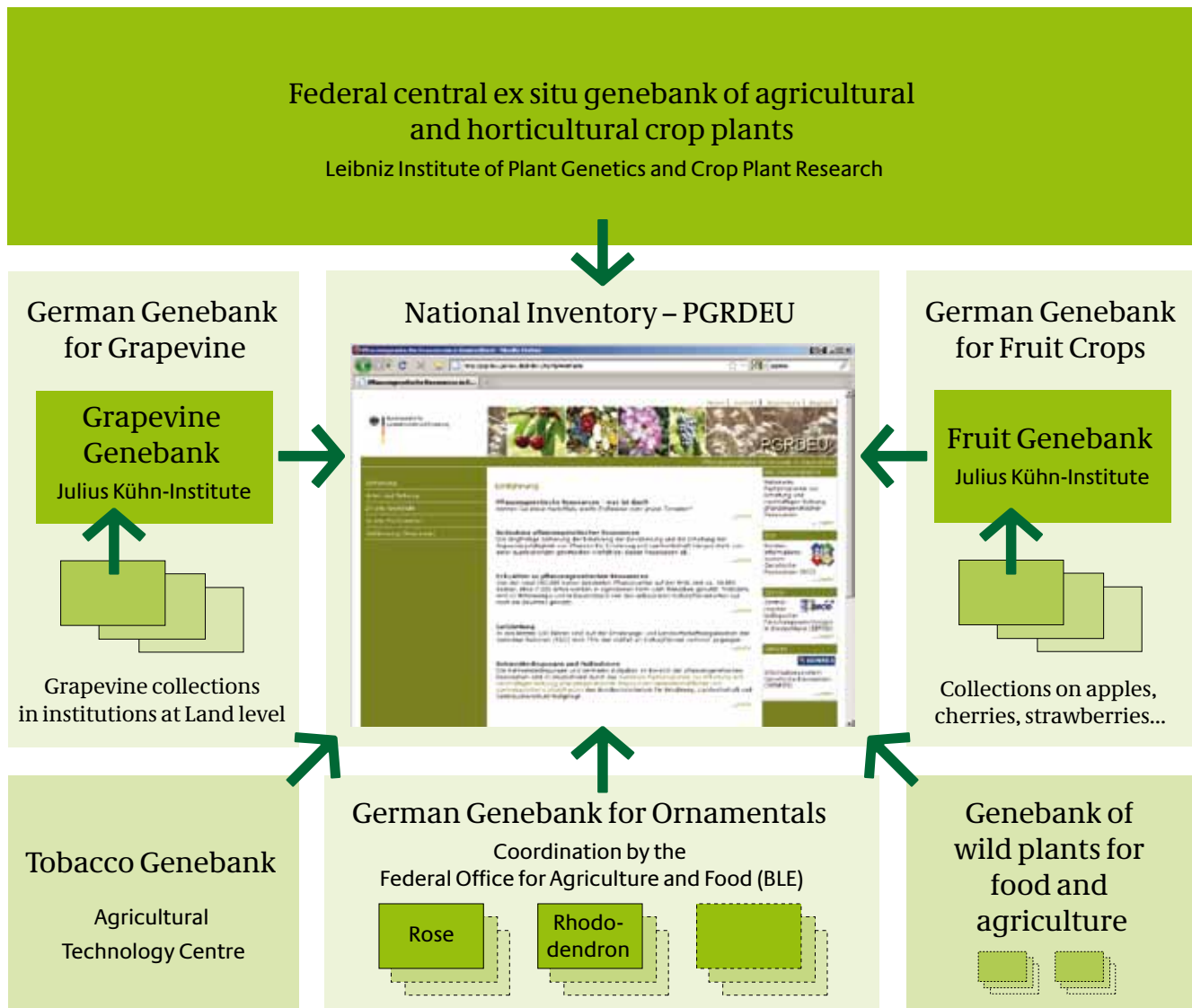
Checking individual plants of cultivation varieties of vegetables at the Bundessortenamt (Federal Plant Variety Office)

ing the necessary information about their characteristics and possibilities for their use (Characterisation and Evaluation). What is significant for this is, above all, evaluation and research activities, and yet also the retention of traditional knowledge. Corresponding inventories need to be produced and systems of documentation, information and monitoring need to be built up and expanded. Lastly, efficient knowledge management is imperative. Corresponding institutions and activities can be organised or respectively implemented both on a centralised and on a decentralised basis – as networks, if that approach is applicable. The latter approach has the advantage of being able to use synergies, through making avail of existing structures and coordinating programmes and measures more effectively. With regard to measures of this kind, the activities of existing private initiatives also need to be taken into account. These goals are also taken up by the Strategy for Agricultural Biodiversity. In order to secure the available capacities, but primarily with regard to requirements expected to emerge in the future (e.g. in the context of international cooperation), it is necessary to modernise existing institutions aimed at conservation and to expand their quantitative capacities. What is also necessary, above all, is to ensure the quality of conservation or respectively to improve it where possible, adapting it to meet international standards. In this context, modern information systems (see Chapter 4.4) also play a significant role in enhancing the quality and efficiency of conservation work.

17 [http://www.bmu.de/files/pdfs/allgemein/application/pdf/broschuere\\_biolog\\_vielfalt\\_strategie\\_bf.pdf](http://www.bmu.de/files/pdfs/allgemein/application/pdf/broschuere_biolog_vielfalt_strategie_bf.pdf)



## Ex situ conservation and documentation of PGR in Germany



### Action needed

- Securing and, where applicable, expanding existing capacities for conservation.
- Securing the quality of conservation work and, where applicable, adapting it to international standards.
- Fitting national activities into the international strategies, e.g. the Global Crop Diversity Trust.
- Optimising *ex situ* conservation by means of securing the corresponding institutions over the long term and attaining long-term improved co-operation between them (e.g. genebanks, Botanical Gardens, museums).

#### 4.1.1 Federal Central Genebank for Agricultural and Horticultural Crop Plants

The federal central *ex situ* genebank is situated at the **Leibniz Institute of Plant Genetics and Crop Plant Research (IPK)**<sup>18</sup>. The genebank of cultivated plants, jointly financed by the Federal Government and the Länder, ranks among the oldest and most significant collections in the world, with an overall stock of 151,000 samples of more than 3,200 different species from almost 800 botanical genera. Apart from the main site in Gatersleben, the genebank of crop plants maintains collections in its annex facilities in Malchow/Poel (for oil plants and fodder plants) and Groß Lüsewitz (for potatoes) respectively. Storing security duplicates in the *Svalbard Global Seed Vault* on Spitzbergen island in Norway provides an additional element in securing the genebank material. 30,000 accessions have already been sent there; the aim is to duplicate the entire collection.

The tasks of the genebank encompass the collection, conservation, documentation and provision of plant genetic resources. A point of emphasis in this is the ongoing adaptation of the internal activity sequences for propagating and storing plant samples, to align with international standards, as well as the further optimisation of quality management. Beyond this, research work is undertaken with the aim of further optimising the collection management and for making plant genetic resources useful for the cultivation of plants. The cultivated plants' genebank thus makes an important contribution to the conservation of diversity among crop plants and the wild species related to them; it provides the foundation for a more targeted and more varied use of the genetic resources in research, in plant cultivation, in agriculture, biotechnology and environmental protection.

Apart from its own contributions to research, it makes seed and planting stock available to a wide spectrum of users. Thus, for example, in 2010 more than 33,000 samples were issued, 25 % of which went to research institutions, 57 % of which went to non-government organisations and 13 % of which went to plant breeders. In making these resources available



Small greenhouses in the IPK

via the SMTA, the federal central genebank is also supporting the implementation of the ITPGR.

The IPK supports the build-up of the “European Genebank” (AEGIS). The genebank information system GBIS is being expanded and adapted to match the new requirements of collection management. The European and international databases of types of crops for *Allium*, *Hordeum*, *Minor Leafy Vegetables* and *Poa* are being continued.

Another important contribution is the *ex situ* conservation of pure-line varieties of agricultural species, including vegetables. If the authorisation of a given variety expires at the Bundessortenamt (Federal Plant Variety Office), and subject to the consent of the breeder, the last sample of seed is stored at the IPK, including the description of the variety. As the IPK issues seed material in accordance with the SMTA conditions, this represents a further important contribution made by private cultivators of plants to the multilateral system of the ITPGR. Against the background of increasingly scarce conservation resources at the IPK, consideration must be given and rules introduced accordingly to ensure the lasting *ex situ* conservation of seed from varieties of agricultural species, including vegetables, for which the authorisation is expiring.

### Action needed

- Further extension of the existing cryo-collections (potato, *Allium*, *Mentha*).
- Expanding the capacities for characterising and evaluating PGR.
- Further development of the genebank information system (GBIS) with regard to adaptation to meet new requirements for data exchange and data integration.
- Creation of the necessary prerequisites for the lasting conservation of varieties of agricultural species, including vegetables, as part of the IPK's genebank collection (including the samples of seed taken over from eliminated varieties).

#### 4.1.2 German Genebank for Fruit Crops

Over the course of the centuries, fruit farming activity has developed a great diversity of species and varieties of fruit. Estimates state that, in this process, approx. 40 species and between 5,000 and 6,000 varieties or origins were used: there are around 2,000 varieties of apple alone. The conservation of native resources in terms of fruit genetics serves as a foundation for the long-term safeguarding of fruit farming in Germany. For this reason, since the start of the 20th century, numerous varieties of different species of fruit have been conserved in state-owned and non-state-owned collections. They serve as the genetic basis for the cultivation of new varieties. Beyond this, they are a part of cultural history, substantially contributing to the conservation of our cultivated landscape's structure. However, conserving genetic resources in many mutually-independent collections gives rise to problems. While individual genotypes are conserved in many of these collections, others are only to be found in one collection, in a few, or indeed in none at all. Long-term, this leads to a gradual creeping process of loss.

BMELV's strategy for agricultural biodiversity provided for the creation of the German Genebank for Fruit Crops (DGO); this is now a decentralised network in which collections have pooled resources by means of a contract of cooperation; they are coordinating their

work of conservation. The coordination point is at the Julius Kühn Institute (JKI), namely its Institute for Breeding Research on Horticultural and Fruit Crops, located in Dresden-Pillnitz.

Among a total of about 50 species of fruit currently farmed in Germany, 30 are native to Germany – i.e. farmed traditionally; the intention is to conserve them. For each of these species, a selection is made to decide upon the varieties to be conserved. Those conserved are, above all,

- German varieties, including German newly-developed varieties,
- varieties with a socio-cultural, local or historical point of reference to Germany and
- varieties with important fruit-farming characteristics, for research and cultivation purposes.



Various forms of apple

To date, three networks have been established specifically dealing with species of fruit. In the apple network, six partners are involved, each maintaining a collection, with around 950 varieties of apples characterised as being “worth conservation”. The two partners in the strawberry network are conserving around 400 varieties in total. Seven partners have come together to form the cherry network, currently conserving around 300 varieties of sweet cherry and 100 varieties of sour cherry. At the JKI in Dresden-Pillnitz, to supplement the field collections, tests are being conducted for cryo-storage or respectively cryo-conservation, e.g. the storage of meristems and sleeping buds in liquid nitrogen (-196 °C). The aim of this long-term storage is to prevent losses in collections due to biotic and abiotic harmful factors.

In order to guarantee the authenticity of the varieties to be conserved, a pomological test of authenticity is carried out. After this, for all varieties, DNA fingerprints are produced in accordance with the guidelines formulated by ECPGR or respectively by the European large-scale research project GENBERRY. Both activities are conducted within the framework of BMELV assignments to obtain status snapshots and surveys of material held, as well as non-scientific surveys on the topic of biological diversity.

The varieties to be conserved, and also the associated evaluation data, are documented on the DGO website ([www.deutsche-genbank-obst.de](http://www.deutsche-genbank-obst.de)). By the end of 2013, the updated data will be reachable at the new address – [www.deutsche-genbank-obst.jki.bund.de](http://www.deutsche-genbank-obst.jki.bund.de). Interested parties can then research the stock held in collections and directly submit enquiries based on old varieties’ planting stock.

### Target structure: German Genebank for Fruit Crops



### Action needed

- Ensuring a high level of quality in the range being conserved in the German Genebank for Fruit Crops and also in its conservation standards.
- Surveys concerning the authenticity of varieties (pomological and molecular-biological), documenting and characterising the accessions.
- Expansion so as to include further crop-specific networks.
- Securing all material obtained at a minimum of two locations (security duplicate) within the German Genebank for Fruit Crops.
- Take-up of supporting partners into the German Genebank for Fruit Crops.
- Expanding the cryo-conservation of the JKI's *Fragaria* and *Malus* collection.

### 4.1.3 German Genebank for Grapevine

An estimate made by the Institute for Grapevine Breeding Geilweilerhof (a part of the Julius Kühn Institute (JKI)), concludes that, in the past, around 300 varieties of grapevine attained noteworthy significance in the German-speaking countries. Of these, 15–20 varieties are still classified for cultivation today. Apart from the protection of ecologically valuable old vineyards, what is called for is to secure the genetic basis of traditional varieties of grapevine.

Collections of genetic resources for vines are held at the Institute for Grapevine Breeding Geilweilerhof and also primarily in various Länder-specific institutions. For the purpose of coordination and to enhance efficiency, as envisaged in BMELV's Strategy for Agricultural Biodiversity, the German Genebank for Grapevine was founded on 9 July 2010, as a network of institutions conserving grapevines at Federal and at Länder level. At JKI the genebank collection also serves as starting material for the cultivation of grapevines with a high degree of resistance to pests, diseases and abiotic stress, as well as to the further development of cultivation research on grapevines. The grapevine (*Vitis vinifera* L., varieties and species growing in the wild) is conserved in open-ground conditions. The stocks in Siebeldingen currently comprise around 3,800 accessions. The national and international documentation of genetic resources



regarding vines is supported by two databases: the European *Vitis* database and the international grapevine database (*Vitis International Variety Catalogue*), both taken care of by the genebank department.

### Action needed

- Improvement of the legal framework for conserving the grapevine varieties traditionally used.
- Continuation of recording, documenting and conserving genetic resources of grapevines in old vineyards, within the context of registration projects, as well as their conservation, particularly for future clone cultivation.
- Determination of criteria for conserving species, varieties and clones of grapevines, for building up and expanding the stock in collections held by the German Genebank for Grapevine, based on the collections of the genebank partners and spearheaded by the JKI, together with other partners.
- Evaluation and ampelographic and molecular-genetic characterisation of species, varieties and clones of vine.
- Development of efficient procedures for eliminating viruses from genebank material within the framework of research projects.
- Guaranteeing high standards in the conservation activities.

#### 4.1.4 German Genebank for Ornamentals

With around 3,600 genera, 18,000 species and 40,000 varieties, the diversity in collections of ornamental plants in Germany is enormous. The economic potential of these natural resources is an essential aspect for the horticultural business.

The German Genebank for Ornamentals is conceived and organised as a network of genebanks, in which institutions and involved parties with important collections of ornamental plants work together, in order to jointly conserve the national inventory of these genetic resources. These networks are structured in accordance with the specific conditions in the part-networks, in the form of a cooperation agreement. This involves mandatory and optional elements. In purely organisational terms, the role of coordination point for the respective genebank network must always be occupied. In addition, an institution must make at least parts of its collection available as the stock of the collection for the corresponding genebank network (the Collection-Holding Partner).

Another substantial element is the simplified provision of resources for research and cultivation: this is arranged via a standard material transfer agreement (as a constituent part of the cooperation agreement). Optional elements include, for instance, the involvement of partners who do not bring any collection stock of their own into the genebank network, but support the work in the network by providing their own capacities and expertise (Supporting Partners).

The German Genebank for Ornamentals forms the umbrella organisation for these part-networks and is coordinated by the Information and Coordination Centre for Biological Diversity (IBV), part of the Federal Office for Agriculture and Food (BLE). In this function, the BLE also documents the overall stock via the National Inventory of Plant Genetic Resources (PGRDEU). Further connecting elements, such as a joint logo and an advisory council (yet to be established), support the process of involving the part-networks.



Arch of roses in the Europa-Rosarium Sangerhausen (ERS); the ERS is the coordinator of the German Genebank for Roses



Comparing three petunia blossoms

In the spring of 2009, the German Genebank for Roses was founded as the first part of the German Genebank for Ornamentals. The next sub-network to be founded, in May 2010, was the German Genebank for Rhododendron ([www.lwk-niedersachsen.de/genbank-rhododendron](http://www.lwk-niedersachsen.de/genbank-rhododendron)).

The long-term goal is to extend and reinforce the German Genebank for Ornamentals, particularly by improving cooperation among the parties already involved in this area of activity. The possibility of involving Botanical Gardens must be checked in instances where the garden's mission, and the understanding of its role resulting from this, permit a collaboration to develop with private plant-enthusiasts' organisations or plant-breeder companies.

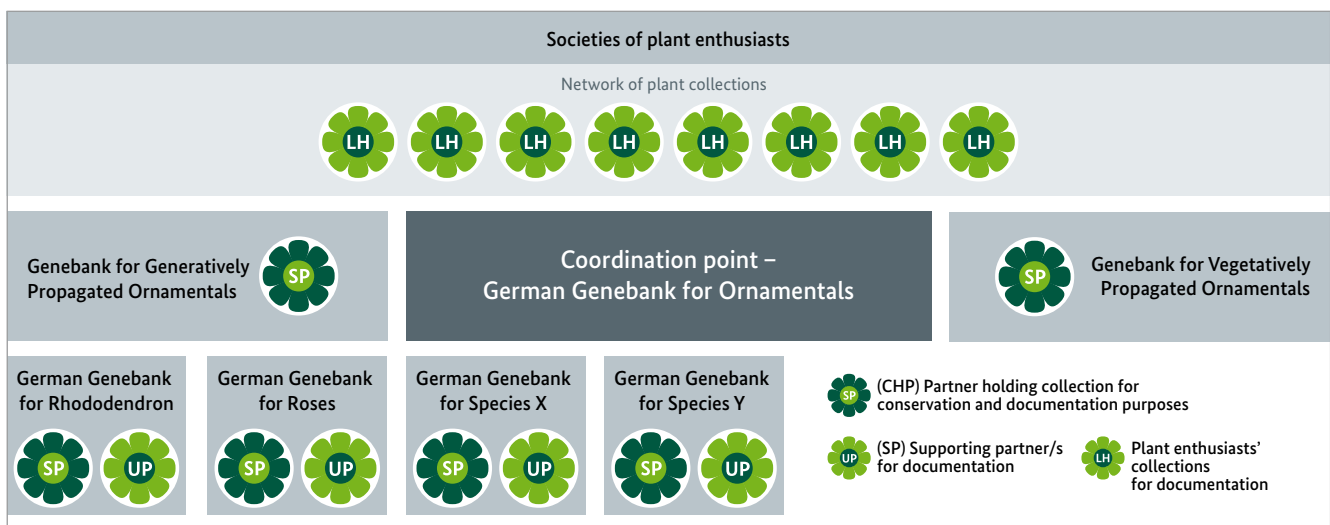
Based on the above criteria and information, a concept was developed by the coordination point of the German Genebank for Ornamentals and supported by an expert group, operating as the foundation for the build-up and expansion to follow. The structure outlined here is presented graphically in the illustration below.

What is important is the supporting involvement of the private collectors and societies of plant enthusiasts in the overall concept for the German Genebank for Ornamentals. In Germany there were more than 30 societies of plant enthusiasts in 2010; estimates indicate around 30,000 members. The members of these societies usually not only command an enormous range of specialist knowledge; in part they also own very extensive collections of genetic resources relating to the respective taxa of ornamental plants.

With the Deutsche Gartenbaugesellschaft 1822 e. V. (DGG: horticulturists' association) acting as the umbrella organisation, the Federal Working Association for Plant Collections (BAPS) was established in 2010. Accordingly, what is in prospect is an intensive cooperation between the German Genebank for Ornamentals and the societies of plant enthusiasts, or respectively with the DGG, with mutual support as the objective. The model and demonstration project "Network of Plant Collections" is intended to create the organisational framework for this.



### Modular construction of the German Genebank for Ornamentals



### Action needed

- Drawing up of a concept for promoting coordination points of decentralised genebanks and conservation networks for horticultural plant genetic resources, by the Federal Government and with Länder participation.
- Expansion of a Genebank for Generatively Propagated Ornamentals, as part of the German Genebank for Ornamentals.
- Build-up and expansion either of a Genebank for Vegetatively Propagated Ornamentals or of a genebank network, involving substantial participation by Botanical Gardens, as part of the German Genebank for Ornamentals.
- Founding of further genebank networks specific to genera / species, paralleling those for roses and rhododendron.
- Expanding the National Inventory on Plant Genetic Resources (PGRDEU) to include species and accessions held by the German Genebank for Ornamentals, with important characterisation and picture data.
- Testing and, where applicable, providing software used to support the documentation of the individual part-collections.
- Involving private collections and societies of plant-enthusiasts, as partners of the German Genebank for Ornamentals, in a “Network of Plant Collections”.



The corncockle (*Agrostemma githago*) is an endangered weed on arable land

### 4.1.5 Genebank for Crop Wild Relatives

A strengthening of the efforts to conserve wild plants for food and agriculture is one of the essential demands stated in the FAO’s Second Report on the State of the World’s PGRFA; it is also an essential element of the corresponding Global Plan of Action (regarding the significance of CWR see Chapter 4.2.2: *In situ* conservation of crop wild relatives (CWR)). Due to the limited capacities of the IPK federal central genebank of cultivated plants, this organisational unit concentrates on the most important cultivated plants of moderate climates and a selection of wild species related to them. In order to conduct conservation work on plant genetic resources occurring in the wild specifically in Germany, four Botanical Gardens (Osnabrück as the coordinator, Berlin, Karlsruhe and Regensburg) have currently grouped together into a genebank network for crop wild relatives. The focus among the species targeted for conservation is on endangered native species of agricultural and horticultural crop plants, based in the wild – particularly those conserved by means of diaspore (mostly seeds) – which are particularly significant for the national research and breeding work. This also entails a contribution to the implementation of the Global Strategy for Plant Conservation (see Chapter 3.1.1).

With support from BMELV, a concept is being developed and tested out on a model basis<sup>1</sup>: it involves *ex situ* conservation of crop wild relatives, taking particular account of the activities of competent partner institutions (e.g. genebanks). The approach thus provides a further example of how Botanical Gardens can be involved in the conservation of plant genetic resources for agricultural and horticultural species.

### Action needed

- Further developing the concept for the *ex situ* conservation of native crop wild relatives, taking particular account of activities of competent partner institutions (e.g. Botanical Gardens).

1) [www.biologie.uni-osnabrueck.de/genbank-wel/Home/](http://www.biologie.uni-osnabrueck.de/genbank-wel/Home/)





Internet portal of the Genebank for Wild Plants for Food and Agriculture

- Founding the Genebank for Crop Wild Relatives, as a decentralised genebank network.
- Gaining further partners to support the Genebank for Crop Wild Relatives..
- Building up security duplicates.
- Continuously extending Germany's nationwide *ex situ* CWR species to be conserved, and the latter's populations; this is coordinated with existing collections, particularly with the IPK's genebank of crop plants.

#### 4.1.6 Implementation of the “European Genebank” (AEGIS) within the framework of the ECPGR

The concept drawn up within the framework of the ECPGR, for an European integrated genebank system – “AEGIS” (“European Genebank”), emerged with Germany having a significant involvement (see Chapter 3.2.2). Its implementation, through the founding of AEGIS and the associated national activities, should be pursued as an equal priority task alongside the further development of AEGIS at European level.

With AEGIS, the plan is for the resources available in Europe to be coordinated efficiently and deployed

for the conservation of plant genetic resources. To this end, AEGIS member states' institutions pursuing conservation goals take on an obligation, in a concept based on the division of labour, to conserve appropriate plant genetic resources long-term as European accessions, according to common standards, and also to make them available according to the conditions of the SMTA in the International Treaty, for research and cultivation work. The Member States thus go beyond the obligations stated in the International Treaty for Plant Genetic Resources – the latter envisages this approach solely for species referred to in Annex I. Germany is playing an active role in the further development of AEGIS, particularly in the ongoing activities for *Allium* and *Avena* and in the advisory committee of AEGIS. For the formal founding of AEGIS, a *Memorandum of Understanding* (MoU) was developed between nations. The nations thereby declare their entry into AEGIS. At the start of 2012, 30 states had signed this MoU. The involvement of institutions concerned with conservation within an AEGIS Member State is arranged via the “Associate Membership Agreement” (AMA). In Germany, the AMA has been concluded by the National Coordinator at the Information and Coordination Centre for Biological Diversity of the BLE, with the IPK, JKI and BSA. Further partners are set to join up.



Onion plants in the showcase garden of the VERN (a Brandenburg conservation organisation)

#### Action needed

- Conclude “AEGIS Associate Membership Agreements” with further partners, through the National Coordinator.
- Drawing up lists of suggestions for “European Accessions”.
- Drawing up lists of suggestions for “AEGIS Services”.
- National implementation of the AEGIS tasks checked and taken on by the ECPGR (conservation of “European Accessions” and also provision of “AEGIS Services”).
- Supporting the development of a European financing arrangement for AEGIS.

#### 4.1.7 Implementing the Multilateral System (MLS) of the International Treaty

In order to fulfil its international obligations, Germany must continue with the national implementation of the International Treaty. This relates, firstly, to the involvement of further protagonists (both public and private), who participate in the MLS with their collection or parts of it, and use the SMTA for the issue of material (cf. Chapter 3.1.2). Secondly, in the context of benefit-sharing (Article 13 of the International Treaty) and alongside the financial benefit-sharing process in the SMTA context, the intention is primarily to promote the following: the exchange of information, the transfer of technology, and the build-up of capacities.

#### Action needed

- Provision of further plant genetic resources for the MLS of the International Treaty through the German Genebank for Fruit Crops (among others).
- Improving the level of participation of private individuals and organisations in the MLS.
- Drawing together of existing measures for the purpose of exchange of information, transfer of technology, and build-up of capacities.
- Supporting the build-up of capacities in the area of cultivation of plants and provision of seed in Member States of the International Treaty.



Seeds of various cultivated plants

## 4.2 *In situ* conservation

### 4.2.1 *On-farm* management

In the CBD's definition, *on-farm* management of resources constitutes a special case in *in situ* conservation, one in which PGR are conserved and further developed within the framework of an agricultural or horticultural use. The Second Report on the State of the World's Plant Genetic Resources emphasises the special significance of *on-farm* management of resources for the conservation of PGR. Nevertheless it is also clear that there is a lot of catching-up to do for the development of scientifically-founded concepts in this area of activity. Involved parties are also urged to promote stronger international networking of these activities.

In agriculture and horticulture, planting activity worldwide is being concentrated to an increasing degree on a few types of crop, mainly due to the prevailing conditions of competition. Due to a lack of value creation or demand, plant-breeding activity also emphasises the more commercially-interesting cultivated species. If programmes of cultivation are not continued, a loss of genetic diversity is also to be expected.

If varieties of cultivated species for agriculture are no longer planted over a large area, and are thus threatened by genetic erosion, even *ex situ* conservation offers only a partial solution. On the one hand, reasons of capacity alone dictate that not all varieties cultivated can be conserved *ex situ*; on the other, these varieties are merely "frozen" in a particular status quo in terms of their performance characteristics. No more progress is made in terms of their cultivation and also no more adaptation to changed environment conditions and requirements of use. Thus the direct use of such varieties for planting, after more extended *ex situ* conservation, is usually only possible after a certain amount of processing in terms of their cultivation. However, in part the genetic potential of these varieties is to be found in their generations of descendant varieties.

Through *on-farm* management, crops not being processed in commercial cultivation activity can also acquire significance for planting purposes.

That way, *on-farm* management can make an important contribution to the conservation of diversity of



Many old cultivated plants, like the black emmer, have almost disappeared from cultivation

species among cultivated plants and also the diversity within species. Directly linked to this is a possible extension of the range of foods available and thus of diverse nutrition, rich in variety, or the innovative use of plants, e.g. for technical or energy-related purposes. If efforts prove successful in using funding measures and encouraging the desired behaviour among consumers in nutritional and demand terms, this once again makes it attractive to farmers to grow native cultivated plants threatened by genetic erosion: accordingly, niche markets could develop.

*On-farm* management could also contribute to the increase of biodiversity in agricultural production by

- increasing diversity of species,
- increasing diversity of varieties among neglected cultivated plants,
- increasing genetic diversity,
- the conservation of historically significant cultivated plants and forms of resource management,
- the dissemination and cultivation of knowledge and practical skills,
- the conservation of niche markets for regional products.

In 2011 **two Länder, in particular, promoted *on-farm* management** in Germany. In Brandenburg, within the framework of the cultivated landscape programme "KULAP 2007" (being funded since 2000), initiatives include financial support to the planting of around 70 old cultivated varieties and regional varieties of six species of cultivated plant (wheat, barley, rye, oats, millet, maize) threatened by genetic erosion.

In North-Rhine Westphalia (NRW), a model project was conducted: its goal was to evaluate old varieties, their reintroduction to agricultural production, and the development of new products from these old varieties, as well as the task of marketing them. After the project was concluded in 2006, the activities were continued by the newly-founded Competence Centre for the Conservation of Plant Genetic Resources, at North Rhine Westphalia's Chamber of Agriculture based in Münster; among other tasks, this body holds formal responsibility for organising the production and distribution of seed. This project also benefited from the experience gained in the transnational EUREGIO project named GEVIP, run from 2002 to 2007: the acronym GEVIP means “cross-border development, processing and marketing of historical and also innovative products derived from regional plant-based products”; it was a cooperation between North-Rhine Westphalia and the Netherlands, concerning itself with the development and marketing of new products based on plant genetic resources.

Several Länder also provide support to resource management with regard to **meadows with scattered fruit-trees**, to promote the cultivation of a genetically broad spectrum of old varieties of fruit. Such measures simultaneously serve the purpose of protecting endangered species in these ecosystems. These activities are eligible for co-financing by the EU in the context of Council Regulation (EC) No 1698/2005. As they are not tied to particular requirements in terms of the selection of varieties, the effect of these activities on conservation of “*on-farm*” fruit genetic resources cannot be precisely estimated.

In some regions of Germany there is a successful cooperation between regional initiatives aimed at protection of species and representatives of the Association of Fruit-Growers. In these instances, there is a successful link-up between goals aimed at protecting species and habitats and the *on-farm* conservation of fruit genetic resources.

#### 4.2.1.1 Further development of the “Red List of Endangered Native Crops”

The FAO Global Plan of Action for the Conservation of Plant Genetic Resources for Food and Agriculture declares knowledge about the currently-existing genetic resources to be a fundamental prerequisite for targeted and efficient conservation work. The first



Some gardens are still a refuge for plant diversity

National Programme referred to this back in 2002. The national biodiversity strategy of the Federal Government also provides for the build-up of a list, both of species urgently needing protection by means of *ex situ* measures at national level, and of the diversity within those species.

For these reasons, and to draw attention to the huge decline in diversity of crops (in Germany as elsewhere), as well as to support measures aimed at conserving plant genetic resources and using them sustainably, the **Red List** of Germany's Endangered Native Crops was produced. The Red List is intended to encompass all groups of species of native crops, as well as their varieties, including regional varieties, which were adapted to local conditions in Germany and were of significance.

To provide support to the cultivation of threatened, regionally adapted species of crops, there is the funding principle of “conservation of genetic resources in agriculture” in the context of the joint programme

of “improving the agrarian structures and coastal protection” (GAK). The selection of crops eligible for funding in accordance with this principle is made by the relevant Länder authorities, based on BEKO’s recommendations. The crops that BEKO recommends for funding in the context of GAK are marked accordingly in the Red List.

In the context of the Regulation on Conservation Varieties, the Red List also serves the Bundessortenamt (Federal Plant Variety Office), as well as the formally-responsible service points at Länder level, as a possible reference for a given variety in terms of its significance as a plant genetic resource in its region of origin.

#### Action needed

- Improving the scientific foundations for the compiling of the Red List.
- Ongoing process of updating the list based on BEKO’s recommendations.
- Build-up of an “*on-farm* inventory” at the IBV, based on (among other things) the reports from the Länder, obligatory within the framework of the GAK, about funded areas for each crop, and from other sources.

#### 4.2.1.2 Strengthening *on-farm* conservation and management

Apart from conservation in the context of agricultural use, as well as direct use in plant cultivation, *on-farm* management is also employed (among other contexts) in the case of particularly endangered species and varieties, which have long ago disappeared from commercial use and cultivation; this is done primarily through various conservation initiatives, as well as in museums devoted to agricultural history, open-air museums, in gardens (gardens of homes, allotments and farmers’ gardens) and in the horticultural product range of many horticultural businesses. At present, no up-to-date detailed data surveys have been conducted with regard to the quantity of plant genetic resources conserved by this means; there is no concept for coordinating these various activities and nor are there any concept-based measures in progress, aimed at strengthening this area of activity.

These many and varied individual initiatives undertaken by private individuals and associations are highly significant for conserving the diversity of cultivated plants.



Growing red cabbage and sweet corn

Also of direct significance are the measures within the context of the second pillar of agricultural policy – namely rural development policy – and, within this, primarily the agri-environmental measures, taking the so-called EAFRD Regulation of September 2005 as their legal foundation (see Chapter 4.3.1.). Among the things eligible for funding are forms of use which are especially conducive to the conservation of biodiversity: these include meadows with scattered fruit-trees, meadows managed on the basis of extensification, or organic farming. In increasing the spectrum of types of crop and extending crop rotations, as well as using sufficient diversity within species, the goal is not solely agricultural production which is sustainable and adapted to its respective location; another aim is to contribute to the conservation and sustainable use of plant genetic resources.

The positive impact of the second-pillar measures, in terms of biodiversity, also particularly in terms of conservation and sustainable use of plant genetic resources, can be enhanced by improving the modalities for funding.

Likewise, the **model and demonstration projects** supported by BMELV have proved their benefit: they contribute to the conservation, better availability or strengthened sustainable use of genetic resources in the agriculture, forestry, fishery, and food sectors, including horticulture. The plan is for the completed projects to assume a role-model character for potential imitators.

Successful *on-farm* management must be accompanied by **supporting measures**. For example, these include the build-up of Competence Centres (see 4.2.1.4); the evaluation of plants in practice conditions; the provision of seed and planting stock; the provision of technical support in cleaning and storing seed and planting stock; basic and advanced training for *on-farm* management; the development of new products and marketing concepts; and the establishment of networks of those groups interested in *on-farm* resource management.

Frequently, the central problem is that of attaining sufficient **availability**, propagation and long-term production of **seed** for *on-farm* management. To improve this, corresponding rules have already been issued, targeted at making it easier to market seed and planting stock for varieties which appear to be worth conserving as a genetic resource. Lobbying is in progress in favour of examining further exceptional arrangements for activities aimed at conserving genetic diversity.

### Action needed

- Improved recording, networking and coordination of activities in the area of *on-farm* management.
- Development and testing of a coordinated concept for *on-farm* management, taking into account the existing activities.
- Producing a concept to promote the farming of endangered native crops in Germany.
- Continuation of appropriate funding measures, within the context of the GAK: these include, for instance, diversification of types of crop (among others, leguminosae and cultivation of seed mixtures), catch crops, planting of endangered native crops.
- Testing, conception and, where applicable, establishment of project-independent funding opportunities to support conservation initiatives and committed individuals engaged in *on-farm* management.
- Checking the rules in the law governing seed and, where applicable, plant-variety protection law, in terms of impact on activities undertaken to conserve genetic diversity.

#### 4.2.1.3 Conservation and sustainable use of genetic diversity on grassland

Grassland is an important constituent part of our cultivated landscape; it did not emerge on a large scale before human beings started cultivating the land. More than half of all flowering plants to be found in Germany grow on grassland. For fodder plants and many other cultivated plants of arable land and of gardens, extensive grassland serves as the habitat for the wild species related to them. Thus grassland rich in species serves as an important location for conserving genetic diversity among cultivated plants. All year round, the enduring stocks of grassland plants form a habitat for a large quantity of native species of animals. Grassland also has an important function in terms of protection of waterways, climate and soil with regard to landscapes. In summary, grassland is outstandingly significant, not only for genetic diversity of cultivated plants and their wild relatives, but also for typical cultivated landscapes fulfilling other functions for recreation and tourism.

The natural factors act as the main determinant of the composition of species on grassland and the form of vegetation that it takes (including such factors as location (soil, water conditions, climate, latitude,



Mountain pasture rich in species

etc.)), alongside the resource-management factors. The decisive factors in terms of resource management include: mown grass or use as meadow; what animal life is present; frequency of use (number of crops per year); dates for its use, and techniques used for managing the land. Thus a great diversity of grassland-based societies emerged over the centuries. For more than 120 years, the proportion of grassland has remained more or less constant, at about one third of agricultural land in use. However, over this period, the overall amount of farmed land has been reduced significantly; thus, on a proportional basis, the same is true of the absolute area of grassland. Even if agriculture's use of land area has been reduced in recent years, circa 90 hectares of land are still lost in Germany each day, mainly converted to serve residential, transportation or other business purposes. The continuous loss of area operates in parallel with a greater intensification of agriculture; thus, in some areas, it also leads to an increase in the intensity of use recorded on grassland. Also related to this is a change in the composition of species and frequently a decline in biodiversity.

In the context of the granting of EU direct payments, the EU Member States' challenge is to ensure that applications relate to areas of land for which the proportion of long-term grassland is kept constant, relative to 2003 as the reference year. In the event that the proportion declines by more than 5 %, the Länder are authorised by the provisions of the national act

governing direct-payment obligations to require that further conversion from long-term grassland to another purpose is made dependent on obtaining an authorisation, as defined in a Regulation from the relevant Land. At the start of 2011, six Länder had such specific regulations. In all other Länder, the decline in long-term grassland comprised less than 5 %. Indeed, two Länder even recorded small increases in the proportion of long-term grassland. Beyond this, the granting of direct payments within the framework of the *Cross Compliance* requirements also depends on compliance with existing restrictions against reassignment of land, stated in subject-specific law.

However, biodiversity on managed grassland does not conserve itself, left untended. By means of biodiversity management, the farmer can conserve and develop grassland areas rich in species. This is where the agri-environmental measures within the framework of the GAK come into play: these offer a wide-ranging, flexible, regional-specific set of instruments. So far as it is necessary in regional terms, a targeted adaptation of the measures should be made, where applicable (see Chapter on 4.3.1).

In order to enrich or to restore grassland areas rich in species, with species of plants native to the area, new concepts have been discussed and tried out in recent years (see 4.2.2.4).

#### Action needed

- (Further) developing methods for identifying different forms of grassland based on indicator species.
- Conducting surveys to gather data on occurrences of species-rich, original grassland, or respectively natural grassland in reserves, and testing the application of the concept "genetic reserves" (see Chapter 4.2.2.3) to protect valuable grassland locations in FFH areas.
- Further developing systems for the use of grassland which are appropriate to the given location and economically sustainable.
- Continuing and, where applicable, adapting the funding of agri-environmental measures aimed at promoting biodiversity, within the framework of the GAK; measures include extensive resource management on grassland areas, with the aim of conserving grassland vegetation, valuable in plant-genetic terms, meadows with scattered fruit-trees, and conversion of arable land into greenland used based on extensification.

- Continuation and, where applicable, extension of suitable measures of environmental contracting at Land level, with the participation of the EU and the Federal Government.
- Checking the extent to which one can use points of emphasis in funding for the Federal Government programme “Biodiversity” – such as “Hot-spots of biodiversity in Germany” or also the hitherto undefined category “Further measures of particular representative significance for the strategy” – in order to do justice to the particular significance of species-rich grassland.

#### 4.2.1.4 Build-up of Competence Centres

The build-up of regional Competence Centres comes within the remit of the individual Länder. In accordance with the requirements for action described in BMELV’s strategy for agricultural biodiversity, the Länder were given support by BMELV, for example through model projects for conserving traditional, regionally-typical and threatened cultivated plants



Extensive knowledge of varieties is a prerequisite for conservation work



“on-farm”. Experience has been gained in conserving plant genetic resources at the North Rhine Westphalia Chamber of Agriculture, and also at the Baden-Württemberg Central Office for the Conservation of Varieties, located at the Fruit Farming Competence Centre at Bavendorf (Lake Constance region); this experience points to a more far-reaching requirement for support to *on-farm* resource management at the regional or Länder level respectively. Up to now, for the most part, the other Länder have lacked an infrastructure of this kind for advising and coordinating appropriate interested individuals and organisations. The demand also includes the build-up of networks at the producer-level and spanning various levels in the chain of activities; similarly, part of it is the production and distribution of seed, as well as supporting measures directed at the development and marketing of so-called “diversity products”.

#### Action needed

- Evaluating the work done so far and the experience gained in individual Länder, the goal being to develop guidelines and proposals for action, coordinated with the Länder.
- Providing support in founding further Competence Centres for the conservation, sustainable use and marketing of plant genetic resources, including basic-level and advanced-level training work in addition to publicity work.



#### 4.2.1.5 Build-up of offers of advanced training in the area of *on-farm* conservation of plant genetic resources

BMELV's strategy for agricultural biodiversity already emphasises the importance of strengthened training activity with regard to questions of conservation and sustainable use of biological diversity. To a large extent, knowledge about farming, propagation and use of old varieties is currently cultivated and passed on through plant enthusiasts' initiatives. Unfortunately, professional and scientific courses of vocational training have severely reduced relevant elements of content (e.g. seed gardening, taxonomy) in their curricula. A survey of individuals actively involved in the area of *on-farm* management established that those involved only have an insufficient level of knowledge for plant cultivators, regarding practical conservation of crops through cultivation work. Most of the individuals involved expressed a need for further training. Furthermore, a study was commissioned by BMELV for analysing concepts for *on-farm* management of plant genetic resources in Germany; this established that successful *on-farm* management must be accompanied by supporting measures, which ought to also include the development of new products and marketing concepts.

Practical conservation activity is far more difficult without a link-in to **networks**, because the exchange of experience and information, and also the direct literal exchange of material and equipment have a

decisive importance. The institutions, initiatives and associations already existing serve as a good basis in this regard; nevertheless, established network structures are still currently lacking.

#### Action needed

- Registering of institutions which are suitable in principle for offering further training on the topic of conservation of plant genetic resources and *on-farm* management.
- Drawing up offers of further training (e.g. "conservation gardener"), working together with corresponding educational institutions, as well as organisations pursuing conservation goals.
- Build-up of an offer of further training with regard to new-company formation and marketing, working together with appropriate institutions of further training.
- Drawing up material for further training and tuition, involving existing federal institutions.
- Build-up of a consultation network for conservation of plant genetic resources and *on-farm* management: this is done working together with conservation-based organisations, Botanical Gardens and other involved parties; also involved is the work of profiling the network effectively in publicity terms.

All measures taken are supported and coordinated nationwide through the BLE's Information and Coordination Centre for Biological Diversity.



## 4.2.2 *In situ* conservation of Crop Wild Relatives

More than 2,800 species of our native flora (ca. 3.500 species) constitute what is internationally termed “*crop wild relatives*” (CWR) or they are wild species potentially usable for food and agriculture<sup>19</sup>. These “wild species for food and agriculture” are also a significant resource for plant cultivation. Therefore conservation of this group of species’ capacity to adapt is an important prerequisite for securing sufficient and secure agricultural production of plants, over the long term.

Particularly in view of the large quantity of native, potentially usable species of wild plants, *in situ* conservation is, in effect – not least for quantitative, pragmatic and financial reasons – the sole realistic protective measure. The species remain in their ecosystems, exposed to the dynamic evolution processes.

Conservation of plant genetic resources for food and agriculture has hitherto not played a major role as an objective in its own right, in the context of measures aimed at resource management, providing care, and promoting conservation. Nevertheless, the measures being implemented for many years now – e.g. in environmental contracting – also further the goal of conserving plant genetic resources.

The following can be named as important components in *in situ* conservation: sustainable use of areas of land in agriculture and forestry within the framework of agri-environmental measures, as well as nature-conservation and landscape-protection activities. These activities include (among others) measures for protecting species and for protecting biotope with regard to a given area.

A prerequisite for active management of genetic diversity within species of plant genetic resources occurring in the wild in Germany, including the crop wild relatives (CWR), is a close **collaboration between subject-specialists in agriculture and nature conservation** respectively. Active conservation of genetic diversity on areas selected for the purpose will be all the more efficient and cost-effective, the more species are present within a managed area of land. How-

ever, up to now the extent to which nature-conservation measures are sufficient for actually conserving genetic resources on a lasting basis is just as unknown as are locations with a high incidence of CWR species and a high level of genetic diversity.

An opportunity to get an overview on the species of plants growing in the wild (fern and flowering plants), communities of plants, and the natural vegetation of Germany, is provided by the information on **FloraWeb** (<http://www.floraweb.de/>), produced by the Federal Agency for Nature Conservation (BfN). For the circa 3,500 species of plants growing in the wild, profiles of species characteristics can be called off; these include up to 55 separate items of information about taxonomy, systematic arrangement, biology, ecology, habitat, geographical distribution and stock-level situation, degree of endangerment and protection, as well as photos. Information on the degree of distribution in Germany is accessible via dynamically-produced maps as well as the interactive GIS “FloraMap” application. The inputs come from databases and projects, run by BfN and its cooperation partners and updated on an ongoing basis.

In the context of the reporting system for the “**Natura 2000**” European network of reserves, the species of plants found in these areas are likewise recorded at Land level, according to Annexes II-V of the FFH Directive; however, among the more than 1,000 species of animals and plants of the corresponding Annexes II-IV of the FFH Directive, no more than 50 species of fern and flowering plants are to be found in Germany at all. However, a substantially larger proportion of species of plants is recorded by means of the mapping of FFH habitats (Annex I) and outside of Natura 2000 areas in some instances, in the context of biotope mapping work by the Länder.

Beyond that, at national level there are only few data surveys about the occurrence of plant genetic resources within and outside of existing reserves, or respectively one evaluation of existing mapping data in this regard. Hitherto, detailed surveys made so far mostly relate to specific areas, like individual dots. Apart from this, the variability within species of wild plants is a topic only beginning to be examined.

<sup>19</sup> Of the circa 3,500 species of plants to be found *in situ* in Germany, actual or potential uses have been described for more than 1,000 species, including “breeding” or respectively “ornamental plant” as forms of use, a further circa 1,800 species are added to this as “native” plant genetic resources.



Sea buckthorn (*Hippophae rhamnoides*), a wild plant, the fruits of which can be used to make delicious juices and marmalades

The IBV takes care of a directory of **plant genetic resources**, which includes the cultivated plants and also the wild plants for food and agriculture. This directory is accessible via the National Inventory of Plant Genetic Resources (PGRDEU) (<http://pgrdeu.genres.de>).

Data on plant genetic resources present *in situ* are hitherto only available to a limited extent, for certain species of plants, through the Länder and at municipal and project level. There is not usually a general accessibility of this information or it is only available on a very restricted basis. Within the framework of a model and demonstration project, funded by BMELV – “**Build-up of a reporting and monitoring system for the *in situ* conservation of Brandenburg’s ge-**

**netic resources of wild species related to cultivated plants”** – a model-based reporting infrastructure is currently being built up at Land level; this is intended to provide help in the future by means of improved information flow – both within the Land itself and also from there to the Federal level. Aside from this, via further model and demonstration projects, the occurrence of the related wild species of apple and grapevine, *Malus sylvestris* (L.) Mill. and *Vitis vinifera* subsp. *sylvestris* (C. C. Gmel.) Hegi, is the subject of a data survey and a genetic description; the conservation status of the material obtained is being assessed, and measures for *in situ* management developed and tested.

#### Action needed

- Formulation of a national concept for *in situ* conservation for plant genetic resources to be found in the wild in Germany.

#### 4.2.2.1 Identification of species to be given emphasis

For plant genetic resources growing in the wild in Germany, comprising more than 2,800 species, *in situ* conservation is the most important approach to conservation. The large number of species necessitates to set points of emphasis, in order to be able to plan further protection measures in a realistic and feasible way.

#### Action needed

- Taking care of and continuing the list of plant genetic resources to be found in Germany.<sup>20</sup>
- Developing appropriate criteria, coordinating them at national and international level, and establishing them in order to prioritise plant genetic resources found in Germany in the wild.
- Marking the prioritised species in the list of plant genetic resources according to these criteria, as the basis for further prioritising of conservation activities at national and international level.
- Reporting to international information systems the priority species and measures for their protection (where applicable), for the purpose of coordination at European and international level.

20 [http://pgrdeu.genres.de/index.php?tpl=an\\_Liste](http://pgrdeu.genres.de/index.php?tpl=an_Liste)



Farming landscape with blossoming field margin

#### 4.2.2.2 Measures to reinforce stock levels

To give support to the goal of conserving plant genetic resources found in the wild in Germany, primarily by *in situ* activities, it is necessary to test measures for reinforcing stock levels and measures relating to occurrence and populations of individual species and, where appropriate, to implement the measures. Among other things, there is also a need to test the possibilities for use of existing activities, e.g. in the context of national implementation of the European Plant Conservation Strategy (EPCS, cf. Chapter 3.1.1). Measures for reinforcing stock levels have hitherto been developed and established in the case of *Malus sylvestris* (L.) Mill. and *Vitis vinifera subsp. sylvestris* (C. C. Gmel.) Hegi in the context of model and demonstration projects.

##### Action needed

- Development and testing of a concept for reinforcing plant genetic resources and populations, by means of propagating seed or plants and reintroducing them to the land.

#### 4.2.2.3 Identification, build-up of and issuing recognition to “genetic reserves”

Up to now there are no specific reserves for CWR. The project financed by the European Commission within the framework of the Council Regulation (EC) No 870/2004 – “An Integrated European *In-Situ* Management Work Plan: Implementing *Genetic Reserves* and *On-Farm* Concepts (AEGRO)” concerns itself with all essential aspects of *in situ* management. AEGRO draws together data from European and international sources, harmonising and structuring units of information so that these can be used for decision-making processes. First results show that the quality of the data in various sources (GBIF, EURISCO), brought together more or less on the basis of the lowest common denominator, is not at all sufficient to be considered for aggregation purposes, from the taxonomical and geographical viewpoint; it thus falls short of requirements for prioritising species and areas; such data require extensive reworking.

AEGRO also describes the genetic diversity of selected genera and species, creating the organisational and methodological prerequisites for demographical and genetic monitoring for some of the material present. For these model species, conservation strategies are developed at European level, capable of serving as a template for others. For *in situ* management, quality standards are developed as a prerequisite for improved European cooperation in this area; the possibilities are also tested for setting up genetic-protection sites in “*Most Appropriate Areas* – MAA”. The EU project began in October 2007 and is coordinated by the Julius Kühn-Institute.

As long ago as the National Programme of 2002, provision was also made for identifying reserves in Germany, holding a high density of priority species, and additionally declaring them to be “genetic reserves”. In this context, the results of the AEGRO project can serve as the basis for a national conservation concept.

##### Action needed

- Identifying suitable sites with high “occurrence density” of priority species within the framework of a project.
- Developing / further developing management activities for the priority species.

→ Designating already-existing reserves as “genetic reserves” for priority species; this is done by the formally-responsible organisational units, in coordination with the ongoing work of the Länder authorities aimed at designating the FFH areas.

#### 4.2.2.4 Use of a region’s native wild plants on open ground

The amended law governing nature protection and care of the landscape (Federal Nature Conservation Act – BNatSchG<sup>21</sup>) formulates strict requirements in Article 40 (4), with regard to the introduction into nature of plants belonging to species alien to the respective area<sup>22</sup>: even before the amendment, it was stipulated that, on open ground, no propagated material shall be used which does not have its genetic origin in the respective region. The stipulation in Article 40 Paragraph 4, given direct Federal validity by the Amendment, must be implemented in the Länder and gives no scope for deviations. To make matters easier, a 10-year transitional ruling was set up for the period up to 1 March 2020, in which the area’s own plants, wood and shrubs should be used on a preferential basis. Only after this does the newly-structured mandatory approval requirement take force without restriction.

The qualifying requirement of approval, stated in the Federal Nature Conservation Act (BNatSchG), applies solely to introduction on open ground. This affects all balancing-out measures, re-cultivations, greenery flanking roads and highways, and other activities for greening and re-cultivation out in nature. Agriculture and forestry, including horticulture, are affected because they introduce such material: this applies both in their capacity as producers of an area’s own seed and planting stock, intended to be used out in nature, and also in the context of landscaping services and care.

For **herbaceous plants** there are very simple greening methods, effective and proven in practice for years, such as self-greening, hay-threshing procedures,

or also procedures for transfer of mown material. Further alternative greening methods close to nature have already been tested out in model projects. All the procedures named here have the advantage that the use of available locally-sourced wild plants, native to the area, is secured in the context of introducing the material into the free landscape. However, there is also an increasing demand for a market for seed native to a given area (e.g. “Regiosaatgut” – regional seed) for these greening and re-cultivation activities out in nature. With the national implementation of Commission Directive 2010/60/EU, from the start of 2012 there is the possibility to commercially introduce mixtures of seed material – so-called conservation mixtures, intended to be used to conserve the natural environment – even in those instances in which they come within the scope of the Seed Trade Act.



Grazed grassland rich in species, with wild plants native to the area

21 Bundesnaturschutzgesetz vom 29. Juli 2009 (BGBl. I S. 2542), das zuletzt durch Artikel 5 des Gesetzes vom 6. Februar 2012 (BGBl. I S. 148) geändert worden ist. (Federal Nature Conservation Act of 29 July 2009 (Federal Law Gazette I, p. 2542), last amended by Article 5 of the Act, 6 February 2012, Federal Law Gazette I, p. 148).

22 BNatSchG § 40 (4) „Das Ausbringen von Pflanzen gebietsfremder Arten in der freien Natur sowie von Tieren bedarf der Genehmigung der zuständigen Behörde. (Federal Nature Conservation Act. Article 40 Paragraph 4. Introducing plants of species alien to the region out on open ground, and also introducing animals, requires the authorisation of the relevant public authority. Artificially propagated plants are not alien to an area if they have their genetic origin in that area. Authorisation must be declined if a risk to ecosystems, biotopes or species of the Member States cannot be ruled out. The following are excluded from the requirement to obtain authorisation (...) 4. The introduction of wood and shrubs and also seed outside their habitats, up to and including 1 March 2020; until that date, wood and shrubs and seed should preferably be introduced on open ground solely within their habitats“.

Private-law-based certification systems have already been created in order to guarantee conformity with corresponding quality stipulations. In this way, an area's own seed, obtained by gathering wild plants in a certain region, can be reintroduced in this region – usually after an intermediate propagation. The regions defined in these certification systems take as their orientation point the result of a research project by the Deutsche Bundesstiftung Umwelt (German environmental foundation). 22 German regions were bordered off from one another, by putting together similar natural areas (in terms of climate and location) with a comparable spectrum of species, so as to constitute one region.

Similarly for **wood and shrubs**, a uniform implementation nationwide must be the goal. For this purpose, the “Working Group on Wood and Shrubs Native to an Area” was called into being at the Federal Ministry of the Environment; on the basis of equal rights, this body represents the interests of the public authorities for nature conservation, forestry and horticultural matters at Federal Government and Länder level, as well as those of traffic planning, the tree-school associations and research. With the “Guidelines on the use of wood and shrubs native to the given region”<sup>23</sup>, the Working Group has presented a corresponding basis and recommendations for a practicable implementation. It recommends taking as the basis a division into six areas, taking a uniform nationwide approach for producing and introducing wood and shrubs native to the given area. Recommendations are likewise issued for dealing with greenery flanking roads/highways and for fruit-tree wood and shrubs in the free landscape, as special cases.

#### Action needed

- Support in identifying suitable natural occurrences of plants native to an area, in order to advance the production and the traceability of seed and planting stock from an area's own plants.

## 4.3 Sustainable use of plant genetic resources

The National Strategy for Biodiversity formulates the vision that as great a diversity of genetic resources as possible is used actively and sustainably. This is because this sustainable use is usually the best starting point for long-term conservation of the genetic resources. In the context of BMELV's communication work, the slogan “conservation through use” was launched in the public discussion.

### 4.3.1 Taking agri-environmental measures further

Agri-environmental programmes are an important EU agricultural policy, in particular for preserving biodiversity in agricultural ecosystems, including plant genetic resources, apart from other goals relevant to the environment. These are carried out on circa 30 per cent of the agricultural area in our country. They embrace the principles of conservation and sustainable use of biological diversity, for example through retaining a variety of crop rotations, through keeping regionally-adapted varieties of cultivated plants and races of livestock, as well as through extensification of grassland.

The design of these measures has a significant influence on the goals of this National Programme, due to the measures' scale in financial terms and in terms of the physical area involved.

In accordance with the existing main uses, and the corresponding habitat conditions for CWR, it is necessary for the agri-environmental measures to be taken further on a basis adapted to the location (conditions of the natural habitat, uses). Where applicable – bearing in mind the administrative and monitoring effort it entails – one can check the extent to which the individual measures, indicators and location-specific differentiations of the measures are leading to progress, in terms of being effective measures aimed at conserving plant genetic resources.

23 Leitfaden zur Verwendung gebietseigener Gehölze, Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (BMU), Stand Januar 2012. (Guidelines on use of trees and shrubs native to an area – Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU), Status: January 2012) [http://www.bmu.de/files/pdfs/allgemein/application/pdf/leitfaden\\_gehoelze\\_bf.pdf](http://www.bmu.de/files/pdfs/allgemein/application/pdf/leitfaden_gehoelze_bf.pdf)

### Action needed

- Determining the indicators for the conservation of plant genetic resources as a component in biodiversity, in the process of continuing certain agri-environmental measures.
- Developing and applying location-specific measures, differentiated according to the type of agricultural land and the soil characteristics (among other factors), with a high degree of effectiveness in conserving plant genetic resources.
- Examining the effectiveness of agri-environmental measures for the conservation and sustainable use of plant genetic resources, helped by the corresponding indicators.

### 4.3.2 Further development of sustainable systems of use

An important goal must be to further develop agricultural systems of use in harmony with the goals of conservation and sustainable use of the genetic resources. This affects the classic uses for production of food and animal feed in the main activity areas: arable land, grassland management and fruit farming/wine-growing. Increasingly, however, “renewable raw materials”, “organic energy” and “climate protection” are acquiring importance as areas of production, in terms of conserving and sustainably using plant genetic resources. Within this, potential should also be attributed to those procedures which succeed in integrating important goals of biodiversity protection into productive (i.e. economically viable) systems of use. Viewed from this aspect, the forms of use and production procedures to be developed and supported by projects are those, in particular, which measurably lead to conservation and sustainable use of plant genetic resources being integrated into production. The effectiveness and cost efficiency of existing instruments for promoting agricultural biodiversity, particularly in the case of plant genetic resources, is under discussion.

### Action needed

- Testing out, on a model basis, production procedures which integrate conservation and sustain-



Regional varieties of apple worth conserving

able use of plant genetic resources into production (e.g. model and demonstration projects in arable-farming businesses) and also transfer of the results into agricultural practice in a broader sense.

- Economic assessments of integrated measures promoting protection of agricultural biodiversity and nature conservation and aimed at guaranteeing economically viable systems of use.
- Producing catalogues of efficient nature-conservation measures (manuals for farmers) for arable, grassland, fruit farming/wine-growing and moor areas, as far as possible with a point of reference to the regional, natural habitat.
- Developing and testing procedures for uses aimed at production of bio-energy, taking into account the aspects of conserving plant genetic resources, e.g. use of a broad spectrum of cultivated species, planting of wood for energy in strips located in arable and grassland areas, in connection with further biodiversity goals.

### 4.3.3 Developing and improving indicators for determining the degree of endangerment of plant genetic resources

Nationwide, developed indicators of biodiversity (bird indicators, high-natural-value farmland (HNV), endangered species, butterflies), are helpful in making an assessment of the situation for orientation purposes, with regard to biological diversity in main habitats. The areas of cultivated land are presented in summary by means of highly generalised measurement figures, which are thus relatively insensitive as indicators – e.g. the bird index for agricultural land in Germany. However, these indications are insufficient to assess the following: the situation regarding genetic diversity among plants across an expanse of land, e.g. the development of quantities of species in long-term grassland; genetic diversity of varieties used in farming across large areas; and also, in consequence, drawing conclusions for applying improved management methods. Therefore it is urgently necessary to develop indicators for marking the development of genetic diversity of crops in the production systems. As regards animal genetic resources, in 2010 it proved possible to develop and to introduce a corresponding indicator for the Indicators Report 2010 on the National Strategy for Biodiversity. Existing indicators with a reference to habitats and extensification-based forms of use, important for many species of wild plants – such as the HNV farmland indicator or the bird indicator – need to be developed further in methodological terms: this is in order to guarantee the direct reference to specific uses of agriculture (arable land, grassland, fruit farming/wine-growing, moors).

#### Action needed

- Developing a national indicator – “plant genetic diversity in agriculture and food” – with the participation of the Länder.
- Further developing regionalised, agriculturally-sensitive indicators of biodiversity, based on existing indicators (birds, HNV farmland, butterflies).
- Developing indirect indicators of biodiversity in the form of calibrated fast methods for the local assessment of biodiversity, e.g. estimation procedures helped by characteristics of vegetation structure among the stocks of plants.
- Developing methods for the use of indicators of biodiversity in order to evaluate the biodiversity effects of agri-environmental measures, of measures to take care of the landscape, and of environmental contracting.

- Devising methods for coupling the field data surveys on biodiversity indicators, with the intention being that data surveys from agricultural uses are of help in deducing measures suitable to go into practice: the objective of this is to improve the stock situation of indicator species and also of HNV farmland areas.

### 4.3.4 Promoting of Evaluation and Characterisation

Particular efforts are essential in order to attain a targeted use of genetic resources for improving the breeding of crop plants. The basic prerequisite is their characterisation and evaluation. Characterisation data describe characteristics of plants, which are hereditary to a large extent, and consisting of features visible to the naked eye, such as plants’ full-grown height and date of blossoming. Evaluation data primarily describe more complex characteristics important for the use of the plants, such as yield, planting characteristics, location characteristics and resistance to pests and other harmful factors.

In the evaluation it is increasingly molecular-genetic and plant physiological studies which play the key role. While the sequencing of complex plant genomes (genotyping) is increasingly possible, simple and inexpensive as technology advances, a bottleneck is in evidence with regard to the acquisition of new knowledge on plant genetic resources and thus on utilising them. In particular, this affects the laborious but indispensable process of phenotyping, that is to say the quantitative analysis of plant structure and functions.



Certificate of validity for crop characteristics of the apple



What would therefore primarily be necessary is the development of precise, high-throughput procedures for defining phenotypes, if the use of genetic resources is to proceed in a fast and efficient way in the future.

#### Action needed

- Funding interdisciplinary research projects aimed at high-throughput phenotyping, marker-assisted selection, and testing technology, and also at processing and analysing massive quantities of data, in order to conserve the necessary broad base of knowledge and to build up the essential capacities.
- Extending networks aimed at determining and assessing the characteristics of genetic resources of agricultural and horticultural crop plants, involving the breeders; (among other means) this is done by further extending the National Evaluation Programme for Plant Genetic Resources (EVA II); by extending the assessment of cereal species, e.g. to include characteristics improving the capacity to resist biotic and abiotic stress factors, as well as by involving further cultivated species.
- Evaluating plant genetic resources and intensifying research into plant cultivation, undertaken by the Julius Kühn-Institute in collaboration with private plant cultivation companies, relevant research institutions, conservation initiatives and other involved parties. Apart from the main cultures, (new and no-longer-used) crops – neglected up to now – should also be involved.

#### 4.3.5 Opening up areas of potential for innovation offered by plant genetic resources by means of breeding research

Research into plant breeding forms one of the most important foundations for food security and the supply of raw materials, particularly amid changing production conditions due to climate change and a continuously growing world population. The goal is the genetic adaptation of our cultivated species, or respectively their improvement in terms of plant cultivation, in relation to all possible stress factors (e.g. temperature, dryness, heavy precipitation, pests/disease). The starting point for improvement in plant cultivation is to record, assess and use genetic variation among plant generic resources, for characteristics such as capacity to resist heat and dryness as well as diseases and pests. In the context of research



View of a cultivated garden rich in species

into plant cultivation, the challenge is to record this genetic variation safely and effectively and to use it rapidly. This is the mission of *pre-breeding*. For this purpose, there are cell and tissue culture procedures available today, and also molecular techniques making possible the recording of characteristics at the level of genetic material.

The basis for work of this kind is as large as possible a spectrum of plant genetic resources. Examples of successful use of these resources in BMELV's research activities include the following: attaining lasting resistance to foliar blight in the potato, by using *Solanum* wild species as resources for resistance; the hybridisation, into cultivated barley, of new highly-effective resistance genes against various fungal and viral diseases from the wild species *Hordeum bulbosum*; or the identification of places of origin of blue and yellow lupin that have the capacity to resist anthracnose.

#### Action needed

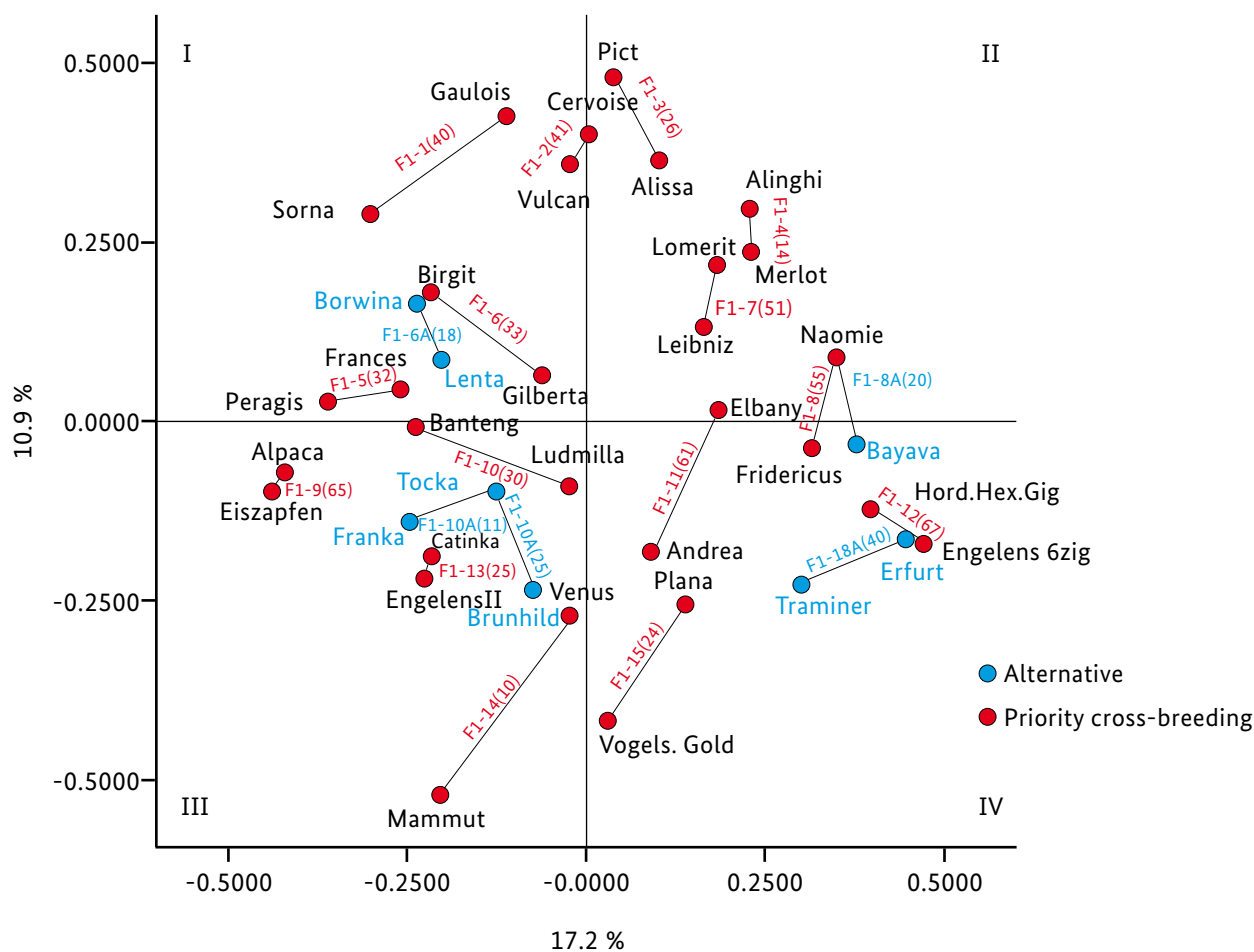
- Further support for research into breeding, in the context of the existing funding programmes (e.g. innovation programme, funding programme for renewable raw materials; demonstration projects on organic energy funded by the Agency for Renewable Resources; Federal Programme on Organic Farming and other Forms of Sustainable Agriculture).
- Promoting programmes and projects for transferring important characteristics into adapted planting stock (producing and further developing basic populations, selection of preliminary-stage material).

### 4.3.6 Broadening of genetic diversity by means of building-up composite crosses (“Evolutionary Plant Breeding”)

Increasing the genetic diversity in elite-cultivated material is an important prerequisite for lasting improvement of cultivated plants. Approaches consistent with this principle range from storing individual resistance genes from wild forms right through to producing so-called introgression lines, containing defined chromosome segments from wild forms or respectively wild species. Research activities relevant to this were also processed in the context of GABI projects – “Genome Analysis of the Plant Biological System”. Beyond this, composite crosses can make important contributions to making plant genetic resources usable and further developing them.

Composite crosses emerge from the crossing of different genotypes, which together encompass the currently-available genetic diversity of the respective breeding pool. Adaptations continue to take place in the generations descended from this cross-breeding, unlike in the case of *ex situ* conservation of the pure original lines: these adaptations are caused by the dynamics of natural selection. In contrast to bred populations, there is no cultivator’s selection, picking out specific characteristics. In the course of the adaptation process, a genetically wide pool can also give rise to particular new gene combinations which would possibly not emerge in that form in the elite material of breeding companies, the latter being subjected to selection processes to a high degree. Composite crosses are an important measure for producing new variability of origins for research into breeding and plant breeding.

#### Principal Coordinates of Analysis (PCoA) of 32 varieties



Presentation of the Principle Coordinates of Analysis (PCoA) for 32 varieties, representing the bulk of the genetic diversity for the range of German winter barley (source: JKI). The Y and X axes respectively describe the proportion accounted for by the first and second dimension of the PCoA. Varieties connected by means of lines denote planned cross-breeding of pairs.



Variety of pumpkins on a market stall

#### Action needed

- Continuation of the composite crosses in the case of barley.
- Planting, development and scientific accompaniment of composite crosses in the case of further important cultivated species (particularly species crossing with other crops, horticultural crop plants).

#### 4.3.7 Marketing of “diversity products”

Apart from using plant genetic resources in the context of cultivation research or plant cultivation respectively, their use should also be promoted by marketing so-called “diversity products”, i.e. products from certain varieties or respectively other species, currently little used.

What serves as a general measure for the further development systems of use, aside from the strategy of agricultural biodiversity, is the promoting

of measures which connect the conservation and use of agricultural biodiversity in a better way and which promote innovation. Above all, this includes the development of suitable marketing forms, as well as informing consumers and educating them on this subject. These approaches can be tested out by means of projects for developing integrated concepts of conservation and use, and for developing funding instruments for innovations promoting the strengthened sustainable use of constituent elements of agrobiodiversity.

#### Action needed

- Conducting studies aimed at (among other topics) highlighting the potential value-creation chains offered by “diversity products”.
- Promoting “diversity products” by using publicity work.
- Promoting innovative products, (among other things) in the context of the Directive, initiated by BMELV, to advance the conservation and innovative sustainable use of biological diversity.

## 4.4 Information and documentation

The strategy for agricultural biodiversity emphasises the significance of strengthened efforts aimed at informing, advising and coordinating, for conserving and sustainably using agro-biodiversity at Federal level, against the background of increasing European and international cooperation. This requires the completion and regular updating of the inventories of available plant genetic resources available *in situ* and *ex situ*, as well as taking them up into the national information system on genetic resources – “GENRES”<sup>24</sup>. Extending this information system as part of the CBD’s German clearing-house mechanism is also a goal in the National Strategy for Biological Diversity.



Internet portal of the Information System on Genetic Resources (GENRES)

### 4.4.1 Building-up and expanding the institutional infrastructure of information

Modern information systems are an essential working tool for guaranteeing quality and efficiency in conservation work with regard to plant genetic resources and their sustainable use. The very rapid technical progress in this area allows for systems of ever higher performance capacity, making possible both a more efficient processing of the increasing quantities of data and also a better adaptation to users' needs. Therefore the challenge is to further expand and update existing systems. In doing so, a “centralised-decentralised” approach will continue to be used, i.e. wherever possible and purposeful, central systems will be built up, due to the new technical possibilities, available to a multitude of users. Alongside this, not least for purely pragmatic reasons, there will also continue to be a demand for decentralised information systems (institutional infrastructure of information) among the involved parties themselves, because each of these users (where applicable) requires other applications which cannot be standardised. In this case, to guarantee the exchange of data, binding standards become ever more important, as already applied, for instance, in the context of updating the National Inventory PGRDEU.

With the new development or respectively the securing of documentation systems run by those involved in the National Programme, or their further extension, the aim is to satisfy an essential prerequisite for an efficient implementation of important parts of the National Programme.

#### Action needed

- Adapting the GBIS genebank information system at the IPK to new requirements, such as the development of an interface to the National Inventory PGRDEU.
- Developing and implementing a genebank information system for the German Genebank for Fruit Crops at the Julius Kühn-Institute. Developing and implementing a genebank information system for the German Genebank for Grapevine at the Julius Kühn-Institute, based on the existing grapevine databases.
- Building-up and expanding information systems of other *ex situ* institutions.



The *Adonis vernalis* is being conserved as part of the *ex situ* conservation cultures of the Botanical Gardens

→ Cooperation between conservation initiatives in building-up joint information systems or respectively for networking already-existing information systems together with the Information and Coordination Centre for Biological Diversity (IBV) of the BLE.

#### 4.4.2 Portal for *ex situ* conservation cultures of native wild plants

The conservation infrastructure of Botanical Gardens is already used in the context of botanical nature conservation. A concept drawn up by the Working Group “*Ex situ* conservation cultures” of the network for botanical nature conservation concerns itself with conserving endangered native wild plants in *ex situ* cultures and making them ready for reintroduction into nature.

In this context, BMELV is promoting the build-up of the first cross-regional and interactive portal aimed at the *ex situ* conservation of native wild plants; in contrast to the genebank of wild plants for food and agriculture, these items are conserved not as stored diaspores, but rather as living collections run by the Botanical Gardens. The portal presents the whole stock of plants held by the conservation cultures

located in German Botanical Gardens. For 75 selected species, including 56 especially relevant for food and agriculture, detailed profiles of characteristics are compiled. Beyond this, the portal offers the possibility for transfer of knowledge and material, and particular offers for horticultural users, as well as a high degree of transparency for public authorities in specialist subject-areas dealing with nature conservation.

Apart from technical implementation, the execution of the project primarily includes extensive research, critical assessment, and arrangement for suitability to the internet, for the following items: background information, profiles of characteristics for selected taxa, items of information on cultures, information for re-cultivators, a material exchange, information on resettlement projects, a priority concept, extensive linking and networking, more far-reaching information and the passing-on of data to the central documentation unit on plant genetic resources of agricultural and horticultural species in Germany (PGRDEU).

#### Action needed

→ Building-up, continuing and further extending the nationwide portal, “*ex situ* conservation cultures of native wild plants”.



Internet site of the nationwide portal “Ex situ conservation cultures of native wild plants”

#### 4.4.3 Building-up and expanding a documentation infrastructure between the Federal Government and Länder for the *in situ* and *on-farm* activities

Data on occurrence of plant genetic resources *in situ* or respectively *on farm* are primarily to be found at the Land level; however, up to now they are only networked to a limited degree and usually not accessible on a uniform basis even within the Land producing them. Information infrastructures for networking the data available in the Länder, as well as an interface to the National Inventory PGRDEU at Federal level, still need to be built-up.



Blackberries: tasty wild plants

#### Action needed

- Implementing the results of the model and demonstration project “Build-up of a reporting and monitoring system for *in situ* conservation of genetic resources of wild species in Brandenburg related to the cultivated plants”, by means of a long-term exchange of data between Brandenburg and the IBV.
- Implementing joint interfaces for the exchange of data used for *in situ* or respectively *on-farm* data between the IBV and other Länder.
- Implementing joint interfaces for the exchange of data between the Länder and the IBV, on the areas per crop funded within the framework of the GAK.

#### 4.4.4 National Inventory “PGRDEU”

The National Inventory (PGRDEU) is the central documentation unit for plant genetic resources of agricultural and horticultural species in Germany.

The PGRDEU also contains and identifies the samples of the German contribution to the Multilateral System (MLS), in accordance with the International Treaty, so that targeted online research into this material is possible.

German institutions have introduced a total of approx. 108,000 genebank samples into the MLS since 2008. Securing the National Inventory and also its further expansion are essential prerequisites for implementing the National Programme and also for fulfilling international reporting obligations.

#### Action needed

- Ongoing update of existing data and its extension in the *ex situ* area, primarily to include the data from the genebank networks, to be newly founded with regard to fruit, grapevines and ornamental plants, or respectively for plant genetic resources (incl. CWR) to be found in the wild in Germany.
- Fulfilling the obligations resulting from the MLS of the International Treaty, regarding documentation and information.
- Further expanding the parts on *in situ* and *on-farm* documentation in PGRDEU, so as to make possible coherent and comprehensive documentation for the whole area of plant genetic resources.
- Further expanding the parts on *in situ* and *on-farm* documentation in PGRDEU, including details on the diversity present in agricultural production (inventory of cultivated plants), so as to make possible coherent and comprehensive documentation for the whole area of plant genetic resources.

#### 4.4.5 National infrastructure of information for Characterisation and Evaluation data

Characterisation and Evaluation data (C&E data) are produced in the most diverse institutions (among others, research institutes, genebanks, plant breeders) and in the context of numerous research projects. Up to now, a user-friendly collation of these data has been started, among other places, in the context of the EVA I project (information system for freely-accessible evaluation data on plant genetic resources) and also in its continuation as part of the EVA II network<sup>25</sup>. However, up to now there has been no up-to-date, coherent national information system for the purpose of centrally storing publicly-accessible C&E data. For that reason, the goal is that the national information and documentation system for characteri-



Cultivated garden with cereal plants

sation and evaluation data (*National Infrastructure of information for Characterisation and Evaluation data in Germany: NICE-D*), yet to be established, should be built up on the basis of already-existing evaluation data (data of the Julius Kühn-Institute, C&E data of the former BAZ/FAL genebank, historical data from the EVA I information system and data from the national evaluation programme EVA II); these are supplemented by C&E data produced in the context of projects in genebanks and universities. The plan is for NICE-D to also offer the opportunity to document data emerging in the evaluation of material from the MLS of the International Treaty in Germany.

#### Action needed

- Building-up an information and documentation system for C&E data at the Julius Kühn-Institute, using publicly-accessible data from EVA I and EVA II, and also the C&E data available at the Julius Kühn-Institute and new C&E data continually coming in.
- Further expansion of the information and documentation system for the documentation of C&E data, which are produced among plant breeders, universities, genebanks, other research institutions and involved organisations/individuals.
- Extending NICE-D to include a model for storing C&E data obtained from MLS material by German recipients.



Field with young peas

#### 4.4.6 Federal Information System – Genetic Resources

The Federal Information System – Genetic Resources (BIG) provides information about wild plants and cultivated plants in Germany, from various decentralised databases. The central element is a portal which makes data available on occurrence and distribution (*in situ* and *ex situ*), concerning characteristics, degree of endangerment and taxonomy, via central access from the partner databases connected to it and processed in a user-friendly way. Although, since the portal was commissioned in 2003, the information landscape with regard to biological data has changed – e.g. due to the further development of GBIF (*Global Biodiversity Information Facility*) – there still continues to be a demand for BIG's special service-offering with regard to plant genetic resources. Yet for the further operation of BIG, experience to date shows

that it is necessary to transfer BIG onto a modern technical state-of-the-art platform, to rework it by including new data sources and developing new offers of information and, in the process, to also further develop the BIG portal.

##### Action needed

- Reworking and expanding the BIG portal, including the central technical components of BIG at the Information and Coordination Centre for Biological Diversity of the BLE.
- Inclusion of new data sources on C&E data and on information about varieties by the BIG partners, together with the Julius Kühn-Institute (NICE-D) and the Bundessortenamt (Federal Plant Variety Office).
- Updating and technically adapting the BIG partner databases.



## 4.5 Publicity work

At the time of the National Programme of 2002 it was already established that the information that the public at large has about conservation and sustainable use of PGR is rather insufficient. Various studies show that, even today, knowledge on the topics of biodiversity, agricultural biodiversity or genetic resources is still very limited. For this reason, the strategy for agricultural biodiversity singled out informing and educating the public as a topic requiring action, and spanning various sectors of activity, particularly with a view to consumers' behaviour in terms of demand and nutrition. In 2010, the UN year of biodiversity, BMELV conducted an extensive communication campaign on the topic.

The build-up of a “network of knowledge on agro-biodiversity”, as part of a broad-ranging German scientific network promoting biodiversity research in the agro-biodiversity strategy, was singled out as a lighthouse project.

In Germany, for various reasons, people's own gardens are becoming less and less part of their everyday lives. This is a factor that promotes the loss of even the most basic knowledge about dealing with useful

plants and their value, i.e. about the visual appearance, the growth, the cultivation, harvesting and use of plants. Thus, paralleling the impoverishment of agro-biodiversity in the immediate sense, knowledge derived from personal experience is being lost.

In the context of the lighthouse project “Diversity campaign – agricultural biodiversity”, part of BMELV's strategy for agricultural biodiversity, an integrated communication strategy on agricultural biodiversity was developed and implemented. This must be continued by means of suitable measures from plant genetic resources as a part-area and continued with the available resources.

### Action needed

- Publishing the National Programme as a brochure in German and English.
- Producing fact sheets and leaflets on the National Programme, produced by various involved parties.
- Producing information material for publicity work on plant genetic resources (e.g. “Who Is Who” of agricultural biodiversity).
- Use of synergy effects in communicating individual activities by the involved parties in the area of plant genetic resources and agricultural biodiversity.



BMELV's campaign bus in 2010 – “Protect and use biological diversity”

## 5 Organisation and Implementation

In ratifying the Convention on Biological Diversity (CBD) and the International Treaty on Plant Genetic Resources (ITPGR), the Federal Government and the Länder have taken on extensive international obligations: among other things, these relate to the conservation and sustainable use of plant genetic resources.

The CBD obliges the contracting parties to develop national strategies, plans and programmes for the conservation and sustainable use of biological diversity as a whole, and to fulfil certain duties relating to provision of information. Germany is complying with this obligation by means of the “National Strategy for Biodiversity”. This strategy is supplemented by the strategy developed by BMELV – the “Strategy on Conservation and Sustainable Use of Biodiversity for Food, Agricultural, Forestry and Fisheries”. This strategy for agricultural biodiversity provides a framework for the sector-specific National Programmes, produced especially for genetic resources with regard to plants, animals, forestry, and fisheries.

Signing the ITPGR entails entering into obligations specifically affecting the conservation and the sustainable use of plant genetic resources for food and agriculture. According to Article 5 of the ITPGR, each contracting party, according to the guidelines of the country’s internal legal stipulations, and where applicable in cooperation with other contracting parties, promotes an integrated approach to the research, conservation and sustainable use of plant genetic resources for food and agriculture. In addition, and so far as is appropriate, the contracting parties take up measures to limit dangers to plant genetic resources to their minimum level or, where possible, to fully eliminate them. These obligations are also taken up in BMELV’s strategy for agricultural biodiversity and also in this Programme.

The provisions of the CBD and the ITPGR have been implemented into national law, in the form of Federal legislation requiring the consent of the Bundesrat, according to Art. 59 Para. 2 of the Basic Law (CBD: Federal Law Gazette II 1993, p. 1741; ITPGR: Federal Law Gazette. II 2003, p. 906). The implementation and monitoring of Federal laws is the responsibility of the Länder, in so far as the laws do not contain any other provisions. In this way, the above-named obligations span all levels of state power in Germany.

Usually, the genetic resources are subject to the power of disposal of the Länder, yet in part they are also subject to the Federal Government’s and that of other non-state protagonists. Accordingly, for fulfilling tasks involved in meeting its legal obligations, Ministry-specific research or the Bundessortenamt (Federal Plant Variety Office) also maintain their own collections of genetic resources.

Within Germany’s federal system, the Federal Government is formally responsible for the conservation and use of genetic resources to the extent that it makes avail of its legislative competence, within the framework of the concurrent levels of legislation, for the promotion of agricultural and forestry production and also for safeguarding the food supply. Also of relevance, among other things, are rulings for the protection of intellectual property (e.g. protection of varieties).

The formal responsibility that the Federal Government has for external relations gives rise to coordination tasks, in relation to programmes at European and international level and agreements for the conservation and sustainable use of genetic resources. To fulfil these obligations, it is necessary to have a national coordination of the corresponding activities of the Länder, involving inventory management, conservation and reporting. At federal level, to a large degree this task was transferred to the Information and Coordination Centre for Biological Diversity (IBV) of the BLE.

The coordination of conservation activities and support of conservation networks by the IBV is also currently evident in (among other things) the coordination of the German Genebank for Ornamentals and the collaboration in various other conservation networks (e.g. grapevines, fruit).

Formal responsibilities held by the Federal Government also arise from the joint funding of research institutions and projects of nationwide and cross-regional significance, undertaken by the Federal Government and Länder. Accordingly, the Federal Central Genebank for Agricultural and Horticultural Crop Plants at the Leibniz Institute of Plant Genetics and Crop Plant Research (IPK) is co-financed by the Federal Government.



**Grassland with scattered fruit trees in a low mountain range**

In Germany, conservation of genetic resources has a long tradition in some areas of activity: in some instances these have well-established state or private structures. In the strategy for agricultural biodiversity and in this National Programme, it is acknowledged that the conservation and sustainable use of genetic resources being pursued cannot be guaranteed solely by state bodies. This is why the Federal Government's and the Länder efforts aimed at conservation are frequently arranged in the form of networks. The various parties involved are coordinated by BEKO, among others, and by this National Programme. As this "National Programme" is a joint programme involving all relevant protagonists on the subject of plant genetic resources, it is also jointly carried forward by all protagonists on a voluntary or on a legislative basis. An up-to-date overview of the individual parties involved in the area of conservation and sustainable use of plant genetic resources for food and agriculture, as well as their contributions to the implementation of this National Programme, can be found in the central information system on genetic resources "GENRES" ([www.genres.de](http://www.genres.de)).

The Federal Government, the Länder and also the individual institutes, committees and involved parties make sure of the implementation of this National Programme by means of their own efforts and services. BMELV takes on a leading role for this National Programme within the framework of the Federal Government as a whole; in doing this, it is given support in implementation for its areas of formal responsibility by the Advisory and Coordinat-

ing Committee for Genetic Resources of Agricultural and Horticultural Plants (BEKO) and the latter's plant-specific and topic-specific groups of experts. The Länder provide support to the programme, where applicable by setting up programmes of their own at Land level, or by bringing individual measures into existing programmes. An essential issue for the transparency, coherence and efficiency of measures taken is the improvement of the flow of information and of communication between those involved. From time to time, the programme is scrutinised, with the principal protagonists taking part in this, and (where applicable) it is continued.

Implementation of measures stated in the Work Programme can be driven forward and supported by agreeing on specific projects. These are described in a project plan defining the project goals and the measures necessary for their implementation, as well as the project partners and their assignments. Further constituent parts of the project plan should be a listing of milestones, a schedule and a financing plan, which can include external financing as well as involved parties' own contributions.

The projects can be initiated both by the parties involved and also by BEKO. BEKO's groups of experts and also the secretariat provide support in producing the respective project plans. BEKO accompanies the implementation of the project; in this regard the secretariat provides support to the exchange of information necessary for this, between BEKO and the other parties involved.

## 6 Glossary of abbreviations

<b>AEGIS</b>	<i>A European Genebank Integrated System</i>	<b>BS</b>	Benefit Sharing
<b>AEGRO</b>	<i>An Integrated European In Situ Management Work Plan: Implementing Genetic Reserves and On Farm Concepts</i>	<b>BSA</b>	Bundessortenamt – Federal Plant Variety Office
<b>AMA</b>	<i>Associate Membership Agreement</i>	<b>CBD</b>	<i>Convention on Biological Diversity</i>
<b>BAZ/FAL</b>	Bundesanstalt für Züchtungsforschung an Kulturpflanzen (Federal Institute for Cultivation Research on Crop Plants) (existed until 12/2007)	<b>CGIAR</b>	<i>Consultative Group on International Agricultural Research</i>
<b>BEKO</b>	Beratungs- und Koordinierungsausschuss für genetische Ressourcen landwirtschaftlicher und gartenbaulicher Kulturpflanzen (Advisory and Coordinating Committee for Genetic Resources of Agricultural and Horticultural Crop Plants)	<b>CGRFA</b>	<i>Commission on Genetic Resources for Food and Agriculture</i>
<b>BfN</b>	Bundesamt für Naturschutz (Federal Agency for Nature Conservation)	<b>CWR</b>	<i>Crop Wild Relative</i> – wild species related to cultivated species
<b>BGB</b>	Bürgerliches Gesetzbuch (German Civil Code)	<b>C&amp;E</b>	Characterisation and Evaluation
<b>BIG</b>	Bundesinformationssystem Genetische Ressourcen (Federal Information System on Genetic Resources)	<b>DGG</b>	Deutsche Gartenbau-Gesellschaft 1822 e. V. (German horticultural association)
<b>BLE</b>	Bundesanstalt für Landwirtschaft und Ernährung (Federal Office for Agriculture and Food)	<b>DGO</b>	Deutsche Genbank Obst (German Genebank for Fruit Crops)
<b>BMELV</b>	Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz (Federal Ministry of Food, Agriculture and Consumer Protection)	<b>ECPGR</b>	<i>European Cooperative Programme for Plant Genetic Resources</i>
<b>BML</b>	Bundesministerium für Ernährung, Landwirtschaft und Forsten (Federal Ministry of Food, Agriculture and Forestry) (today BMELV: see above)	<b>EC</b>	European Community
<b>BMU</b>	Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety)	<b>EAFRD</b>	European Agricultural Fund for Regional Development
<b>BNatSchG</b>	Bundesnaturschutzgesetz (Federal Nature Conservation Act)	<b>EPCS</b>	<i>European Plant Conservation Strategy</i>
		<b>EU</b>	European Union
		<b>EUREGIO</b>	Deutsch-niederländischer Kommunalverband e. V. (A German-Dutch association of municipalities)
		<b>EURISCO</b>	<i>European Plant Genetic Resources Search Catalogue</i>
		<b>EVA</b>	Nationales Evaluierungsprogramm für Pflanzengenetische Ressourcen (National evaluation programme for plant genetic resources)
		<b>EWG</b>	Europäische Wirtschaftsgemeinschaft (EEC: European Economic Community) (changed in 1994 to become the EC see above)

<b>FAO</b>	<i>Food and Agricultural Organisation of the United Nations</i>	<b>KULAP</b>	Kulturlandschaftsprogramm (Farmed-landscape programme)
<b>FFH</b>	Fauna-Flora-Habitat	<b>LfL</b>	Bayrische Landesanstalt für Landwirtschaft (Bavaria's Land-(Federal State) level authority for agriculture)
<b>GABI</b>	Genome Analysis of the Plant Biological System	<b>MAA</b>	Most Appropriate Areas
<b>GAK</b>	Gemeinschaftsaufgabe „Verbesserung der Agrarstruktur und des Küstenschutzes“ (Joint Federal Government and Länder Programme for “Improving Agrarian Structures and Coastal Protection”)	<b>MoU</b>	Memorandum of Understanding
<b>GAP</b>	Gemeinsame Agrarpolitik (CAP: Common Agricultural Policy)	<b>MuD</b>	Modell- und Demonstrationsvorhaben (Model and Demonstration Project)
<b>GBIF</b>	Global Biodiversity Information Facility	<b>MLS</b>	Multilateral System of Access and Benefit-Sharing
<b>GBIS</b>	Genbankinformationssystem des IPK (Genebank information system of the IPK)	<b>NICE-D</b>	Nationale Informationsinfrastruktur für Charakterisierungs- und Evaluierungsdaten in Deutschland (National Information Infrastructure for Characterisation and Evaluation Data in Germany)
<b>GCDT</b>	<i>Global Crop Diversity Trust</i>	<b>PGRDEU</b>	Nationales Inventar Pflanzengenetische Ressourcen in Deutschland (National Inventory of Plant Genetic Resources in Germany)
<b>GEVIP</b>	Cross-border development and marketing of innovative plant products	<b>PGR</b>	Plant genetic resources
<b>GIS</b>	Geo-information system	<b>PGRFA</b>	<i>Plant Genetic Resources for Food and Agriculture</i>
<b>GSPC</b>	<i>Global Strategy for Plant Conservation</i>	<b>RL</b>	Richtlinie (Directive)
<b>HNV</b>	High Nature Value Farmland	<b>SaatG</b>	Saatgutverkehrsgesetz – Seed Trade Act
<b>IBV</b>	Informations- und Koordinationszentrum für Biologische Vielfalt (Information and Coordination Centre for Biological Diversity)	<b>SMTA</b>	Standard Material Transfer Agreement
<b>IPEN</b>	International Plant Exchange Network	<b>SortG</b>	Sortenschutzgesetz – Protection of Plant Varieties Act
<b>IPK</b>	Leibniz-Institut für Pflanzengenetik und Kulturpflanzenforschung (Leibniz Institute of Plant Genetics and Crop Plant Research)	<b>UPOV</b>	International Union for the Protection of New Varieties of Plants
<b>ITPGRFA</b>	International Treaty on Plant Genetic Resources for Food and Agriculture	<b>VITIS</b>	European databanks of types of crop for Vitis
<b>JKI</b>	Julius Kühn-Institut – Bundesforschungsinstitut für Kulturpflanzen (Federal Research Centre for Cultivated Plants – Julius Kühn Institute)	<b>WEL</b>	Wild plants for food and agriculture

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## 9 More Detailed Information and Directory of Addresses

More detailed information, background material and a current directory of addresses for all parties involved in this Programme is found in the Information System on Genetic Resources – GENRES (<http://www.genres.de/kultur-und-wildpflanzen/rahmenbedingungen/fachprogramm>).



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