

Conservation and Management of Plant Genetic Resources (PGR) in German Development Cooperation - Achievements and New Trends

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Abstract

The conservation of Plant Genetic Resources (PGR) has a longstanding tradition in German development cooperation. *Ex situ* conservation projects were implemented during the 70s and 80s in several developing countries and with CGIAR centres. With the Convention on Biodiversity, the importance of genetic resources for the future food supply and for agriculture also became an important issue on the public agenda. The focus of German development cooperation shifted towards holistic approaches with more emphasis on policy frame-conditions as well as on *in situ*/on-farm management of PGR. BMZ/GTZ sectoral projects offer special support for the development of approaches in the area of sustainable management of genetic resources, and assist developing countries to implement specific bilateral or regional research and development activities.

Key words: Plant Genetic Resources, development cooperation

Early history of the Conservation of Plant Genetic Resources in Development Cooperation

The conservation of plant genetic resources in development cooperation already has a 25-year history. With foresight, the German Government started as long ago as 1974 to promote well defined *ex-situ* programmes in the “Centres of Origin”, focusing first on infrastructure development, collection, documentation and storage methods, and integrating at a later stage multiplication, characterisation, evaluation and utilisation of PGR in national and international breeding programmes. *Ex situ* conservation projects, or projects with *ex situ* conservation components, were implemented in Costa Rica, Ethiopia, Kenya, Tanzania, Bangladesh, Morocco and Sierra Leone .

The most important *ex-situ* conservation projects in bilateral or regional development cooperation financed by the Federal Ministry for Economic Cooperation (BMZ) and implemented by GTZ concentrated on supporting the establishment of national or regional genebanks. These are listed below.

In addition, BMZ/GTZ supported the Consultative Group on International Agricultural Research (CGIAR) centres in the establishment of their *ex-situ* germplasm collections. Within the framework of the German support to international agricultural research, the genebanks on forage genetic resources at Centro Internacional de Agricultura Tropical (CIAT) and at International Livestock Centre for Africa/International Livestock Research Institute (ILCA/ILRI), among others, were supported. Several projects were financed in order to develop collections together with the respective conservation methods. The conservation and management of plant genetic resources has always been a priority area in German support to the CGIAR, and so has contributed to a number of successful CGIAR activities, which would not have been possible without this early emphasis on PGR management.

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| No. | Project Title | Country/Region | <i>Concept</i> | Period of Support | Planned Budget, DM million |
|------------|------------------------------------|-----------------------|---|---|-----------------------------------|
| 1. | International Genebank, Turrialba | Central-America | Infrastructure development, collections of PGR, documentation, evaluation, characterisation | 1976-1993 In 1986 a fully functioning service unit was handed over to the partners | 10.8 |
| 2. | National Genebank, Kenya | Kenya | Management of infrastructure and conservation systems, capacity building, training, collection, evaluation and documentation, use of GR | 1983-1994 From 1992 to 1994 consolidation and follow-up support | 10.7 |
| 3. | International Genebank Addis Ababa | Ethiopia, East Africa | Infrastructure development, collection, evaluation and documentation, use of GR, capacity building | 1976 – 2001 Ethiopian Genebank developed into Biodiversity Centre, now GTZ Project on forest genetic resources | 13.1 |

Achievements and Limitations of Early Approaches

These approaches at national, regional and international level were invaluable for the conservation of PGR in general, and for the targeted regions and countries in particular. The achievements of the early projects are still clearly visible today.

The Ethiopia genebank, for example, developed into a biodiversity institute of considerable political importance, both in Ethiopia and in the region. With German support it integrated crop and forest genetic resources as well as *ex situ* and on-farm/*in situ* approaches. Support from other donors (Global Environmental Facility - GEF, etc.) could have been attracted. In global political negotiations on biodiversity and PGR, Ethiopia is one of the most important developing-country players and speaks for Africa in many forums, highlighting the impact of high-level of investment on capacity building in the framework of the early genebank project. Drawing on early BMZ/GTZ support, the Central America region also developed into an important player in the PGR area. A functioning regional network (Meso-American Network for Conservation and Sustainable Use of Plant Genetic Resources - REMERFI) is now in place.

Although the achievements are clearly visible, the limitations of the concentration on a formal *ex situ* approach have become apparent. This approach is based on a high level of investment. Maintenance is very cost intensive. The transfer of genebank projects to partner countries and organisations has caused sustainability problems, which have not been solved in every case. The lack of integration between conservation measures and the use of PGR in the early stages led to collections for which there was no practical application and no proper maintenance. The farmers' role in PGR management and the importance of their knowledge had not yet been recognised, and led to a separation of conservation and farming activities. In the light of all these problems, support to *ex situ* conservation declined, and from the mid 80s until almost the mid 90s hardly any new activities were initiated.

Changing Political Environment and Globalisation

The political environment has changed drastically in recent years, and with regard to increasing globalisation in particular, biodiversity issues and PGR have appeared with increased frequency on global political agendas. Loss of biological diversity ranks among the fundamental environmental problems facing our age, and the commitment of many governments and non-governmental institutions to protect biodiversity has never been greater than it is today. A plant or animal species that dies out today is lost forever, together with its ecological function and economic potential. The enormous speed of disappearance of plant species and varieties has been pointed out by many sources as a real threat to agricultural productivity, since genetic diversity in crop plants for food and agriculture is necessary for breeding (in addition to other traits) higher-yielding, drought and disease-resistant crop varieties.

With the coming-into-force of the Convention on Biodiversity (CBD) in 1993, an international, legally binding framework was provided for the conservation and sustainable use of biodiversity, and this changed the landscape enormously. Prior to CBD, PGR were considered a “heritage of mankind”, with free access for everybody; now they were placed under national sovereignty, emphasising a bilateral approach to the access to and exchange of Genetic Resources (GR). Although this seemed favourable for nature, biodiversity caused many problems for Plant Genetic Resources for Food and Agriculture (PGRFA), especially for the collections held at international level. Consequently, in 1994, the CGIAR’s International Centres signed agreements placing most of their germplasm collections “in trust” under FAO auspices, thus ensuring that all designated material remains in the public domain. However, this is an interim agreement pending the outcome of the negotiations of the International Undertaking.

The IV FAO Technical Conference in 1996 put forward the “Global Plan of Action for the Conservation and Sustainable Use of Plant Genetic Resources for Food and Agriculture”, recommending as priority areas “*in situ* conservation and development”, “*ex situ* conservation”, “use of plant genetic resources” and “institution and capacity building”. The international community agreed to support developing countries in implementing the necessary activities. However, it was not possible to make new funds available.

The World Trade Agreement reached during the Uruguay round (1986-1995), came into force two years after CBD. The World Trade Organisation (WTO)/Trade Related Intellectual Property Agreement (TRIPS) obliges member states to patent plant varieties or implement *sui generis* Intellectual Property (IP) systems.

The International Undertaking (IU) was created by FAO member states in the mid-eighties. Within the context of the CBD, governments are now working to update the IU. Central to the negotiations is the creation of a multilateral system with agreed areas of action, access, and benefit-sharing among members of the system. The negotiations have proved difficult, and many issues have not yet been finalised. If negotiations are not completed in the near future, there is a danger that they will be overtaken by events which follow out of the CBD. In principle, this means that access to PGRFA will be severely restricted, and this might have severe implications for food security in the future. It is still envisaged that the IU will be presented to the COP for consideration as a protocol to the CBD.

“Not surprisingly in this interrelated world a lot of diverse global and regional agreements have impact on the conservation and use of PGR and it is of no agreement which of those changes can be considered positive or destructive.” (Crucible II, Draft, 1999).

New Trends

In the context of increasing international and national awareness, bolstered by conventions coming into force, action plans and active international and national NGOs, German Development Cooperation has boosted its activities in this area again. The current approaches, however, are very different from those pursued in the past.

In line with international negotiations and discussions, the German development approaches to PGR conservation and management today place increasing importance on interventions at global, regional, and national policy levels. This is consistent with the changes in development cooperation in general.

Germany, represented by the respective ministries, is playing an important role in the various international forums. Among other bodies, GTZ is actively advising:

- BMZ on policies with regard to conservation and management of PGR in the CGIAR, on bio-safety and IPR issues, which play an important role in different forums (WTO/TRIPS, CGIAR, CBD, etc.)
- BMZ and BMU (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety) on the further development and implementation of the CDB,
- BMZ and BML (Federal Ministry for Food, Agriculture and Forestry) on the negotiations of the International Undertaking by FAO

Three BMZ/GTZ sector projects are explicitly committed to providing advice on policy issues.

In addition, GTZ is directly involved at the international level, too. Recent examples are the drafting of a paper on “sustainable use of bio-diversity” to be presented to COP 5, or participation in Crucible II, a high-ranking international project led by the International Development Research Centre (IDRC) and composed of a highly diverse group of individuals who “passionately and respectfully disagree on Intellectual Property, Farmers Rights, benefit sharing, and other issues bringing thus transparency into the diversity of existing positions”. (Crucible II, Draft, 1999)

Building strong alliances at the international level thus makes an important contribution to the harmonisation of positions and the formation of cooperative partnerships. In PGR, GTZ’s most important partners are:

- at global level: CGIAR/IPGRI (International Plant Genetic Resources Institute) and ISNAR, FAO, GEF/World Bank, WTO, IDRC, and international NGOs such as Rural Advancement Foundation International (RAFI), etc.
- at regional level:
 - a) in Europe: European Cooperative Program/Genetic Resources (ECP/GR), ECART, European Forum, Swiss Development Cooperation (SDC)
 - b) in Developing Countries: SACCAR, Conférence des Responsables de Recherche Agricoles en Afrique de l’Ouest et du Centre (CORAF), Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA)
- in Germany: German Centre for Documentation and Information on Agriculture/German Information Centre on Genetic Resources (ZADI/IGR), German Foundation for International Development (DSE), Centre for Development Research (ZEF), universities, NGOs

New approaches under development are oriented towards:

- holistic approaches, integrating activities at policy, institutional and community or farm level.
- Integrating agro-biodiversity management in broader approaches to or concepts of rural development, environment, food security, etc.
- Regional approaches
- Integrating conservation and use, and formal and informal systems

The latter refers not only to the integration of formal and informal systems in conservation, such as *ex situ* and *in situ* contexts, but also to the integration of the formal and informal seed systems within the framework of the seed sector development. On-farm biodiversity and seed management by small scale farmers in many developing countries is of utmost importance for national seed security. In many countries, especially in Africa, Asia, and Latin America, 80 - 90 % of seed exchange, and especially of crops with local or regional importance, takes place in the informal sector. These informal systems have been severely neglected, and are now endangered in many countries due to increasing globalisation and the modernisation of food production. They must be strengthened and integrated into formal-sector approaches. A GTZ Project in the Southern African Development Community (SADC) region is developing the necessary strategies and concepts.

Instruments and Projects

Multilateral level

Conservation of agricultural biodiversity is one of the major focuses of the German contribution to the promotion of international agricultural research. Germany, represented by BMZ, is an important member of the **Consultative Group on International Agricultural Research (CGIAR)**. In terms of PGR management, German support is directed towards new subjects such as “*in situ*/on-farm biodiversity management”, “the importance of household gardens for PGR conservation”, “farmer-participatory breeding”, “innovative breeding approaches”, “assessment of genetic diversity and genetic erosion” and, last but not least, towards policy issues. One important activity recently conducted with IPGRI was the development of options for an effective “*sui generis*” system for intellectual property rights on plants and animals, as requested by the WTO/TRIPS Agreement, Article 27(3)b. This publication attracted a great deal of international attention. (Leskien, D., Flitner M., 1997).

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Ongoing projects in PGR conservation and management financed by BMZ and implemented within the framework of “International Agricultural Research” are presented in following table:

| No | Project title | IACenter | German Cooperation Partners | Time frame | Budget, thousand DM |
|----|--|----------|--|------------|---------------------|
| 1. | Effects of genotype and environment on sweet potato yield and quality in developing countries | CIP | | 1999-2002 | 650 |
| 2. | Farmer participation in barley breeding | ICARDA | University Hohenheim | 1996-1999 | 980 |
| 3. | Domestication of indigenous wild fruit trees of the Miombo Woodlands of Southern Africa | ICRAF | | 1997-2000 | 1,600 |
| 4. | Enhancing quality, diversity and productivity of farmers’ pearl millet genetic resources in Rajasthan | ICRISAT | University Hohenheim | 1997-2000 | 670 |
| 5. | Conservation, management and sustainable use of forest genetic resources with reference to Brazil and Argentina | IPGRI | BfH Hamburg | 1999-2002 | 1,600 |
| 6. | Contribution of home gardens to <i>in situ</i> conservation of Plant Genetic Resources in farming systems | IPGRI | Institute of Plant Genetics and Crop Plant Research, Gatersleben | 1998-2001 | 950 |
| 7. | Strengthening the scientific basis of <i>in situ</i> conservation of agricultural biodiversity: Morocco Country Component | IPGRI | | 1998-2001 | 940 |
| 8. | Patterns of genetic diversity and genetic erosion of traditional crops in Peru: rapid assessment and risk prediction using GIS tools | IPGRI | ZADI | 1999-2002 | 1,100 |

With regard to use of genetic resources, only those projects with a direct link to conservation have been selected. In addition to projects mentioned here, BMZ finances several projects on crop improvement using bio- and gene technologies.

At the multilateral level, the Federal Republic of Germany is making a major contribution to the **Global Environmental Facility – GEF**, the most important pool of financial resources for conserving biodiversity. Thirty-four countries, including thirteen recipient countries, pledged over US\$2 billion to the new GEF Trust Fund. Germany is contributing 12%, making it the third-largest donor. Today, only a small proportion of the projects funded under the biodiversity program deal specifically with agro-biodiversity and PGR. However, in the future

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– especially if the International Undertaking becomes a protocol to CBD – it might prove possible to increase the number of projects on the conservation and management of Plant Genetic Resources.

Bilateral/regional level

Although the Federal Republic of Germany, within the scope of bilateral/regional development cooperation, is now supporting more than 100 projects world-wide in which the conservation and sustainable use of biological diversity constitute the focus or at least a minor activity, only a small number of projects deal with the conservation and management of PGR. The most important are mentioned below.

The Meso-American Network for Conservation and Sustainable Use of Plant Genetic Resources /REMERFI

Co-ordinator: Ms. Priscila Henriquez

Duration: 1998 – 2001, planned budget: DM 1.5 million

The objective of the network is to improve the conservation and sustainable use of PGR resources by strengthening national systems, complementary work plans and co-ordination of activities at regional level. Emphasis is placed – to mention only a few issues - on the harmonisation of policies and legal framework conditions at regional level, exchange of genetic resources, complementary focuses in the different national programmes in order to avoid duplication, information management, and on-farm conservation strategies. (Please refer to Ms. Henriquez' paper in the same publication.)

SADC/GTZ Project: Promotion of Small Scale Seed Production by Self-Help Groups

Co-ordinator: O. Neuendorf

Duration: 6/93 – 5/03, planned budget: DM 9 million

Within the framework of SADC's activities in the field of safeguarding the seed supply, the project "Promotion of Small Scale Seed Production by Self-Help Groups" develops different approaches in order to achieve sustainable seed security at farming household level. The project aim is to encourage farmers to maintain their own plant genetic material, to support communities in their efforts to preserve plant genetic material and to develop it further for their own purposes. This is effected by improving the capacity of rural farming communities to acquire, multiply and deliver locally adapted seed varieties.

The project started its activities by analysing the situation in the informal seed sector. Among other interesting findings, Neuendorf (1998) reported that farmers are keen to try new varieties which are available at research stations and seed fairs. A huge number of varieties of different farmer-grown crops were displayed at seed fairs supported by the project. Crops which exhibit interesting traits for farmers and which had recently been threatened with extinction, in particular as a result of severe droughts, have come back and are being grown again on a wider scale. It was deemed advisable for governments and donors to invest in rural seed schemes which focus on strengthening the existing seed production systems in the rural setting. New approaches are being developed with a view to reinforcing those systems and interrelating formal and informal approaches.

Currently, the project is in the process of laying the groundwork for a regional seed security network, which was highly recommended for the SADC region in international workshops. The purpose of this network is to provide a platform for exchanging information and furthering dialogue among the numerous players in the seed sector.

IITA/GTZ Project "Promotion of Seed Production and Marketing in West Africa"

Co-ordinator: Dr. van Gastel

Duration: 1996 – 2001, planned budget: DM 9 million

The starting point for the International Institute for Tropical Agriculture (IITA)/GTZ Project "Promotion of Seed Production and Marketing in West Africa" was the evaluation of regional sources of pure seed and planting materials of suitable varieties which had been "cleaned-up"

health-wise, with the ultimate aim of establishing basic sources of healthy and varietally pure materials.

The project incorporates efforts which also focus on improvements in the informal seed sector. The project is currently preparing business plans for small seed enterprises, and has produced manuals on seed marketing and information for informal seed growers. At the same time, governments are advised to create an 'enabling climate' within which such companies can operate successfully.

Seed projects implemented by GTZ and concentrating mainly on the formal sector have started to incorporate activities in the informal sector as well. This includes the analysis of current seed and biodiversity management systems at the community level; identification of potentials, constraints and opportunities for improvement, with the aim of contributing to effective seed management systems based on the complementary roles of the informal and formal system. However, this involves a paradigm shift, which is not always easy to bring about.

Much remains to be done, however. Experience gained in the SADC/GTZ project and relevant projects supported by other donors must be reviewed. As an important step in this direction, a GTZ concept paper on the informal seed sector is in preparation.

Sectoral Projects

Implementing the Convention on Biological Diversity (CBD)

Co-ordinator: Andreas Gettkant

Duration: 1994 - 1999, Financial contribution so far: DM 10 million

Next phase 2000 – 2002 in preparation

This project supports developing countries to implement the CBD by carrying out a number of measures in fields covering the entire spectrum of the CBD. It contributes to the further development of the different instruments implemented by the CBD (e.g. clearing house mechanism) and supports developing countries in the implementation of innovative pilot activities. In this context, the following projects with relevance for PGR management are supported:

Bolivia: Implementation of national policy on access to genetic resources

India: Revitalisation of traditional in situ/on-farm management and improvement of PGR (M.S. Swaminathan Research Foundation)

Philippines: Bioprospection and access to genetic resources (Southeast Asia Regional Institute for Community Education/SEARICE)

The Tropical Ecology Support Program (TÖB)

Coordinator: Claus Baetke

Duration: 1992 – 2001

planned budget: DM 15 million

The Tropical Ecology Support Program is a supra-regional sector project which aims to contribute to the ecological sustainability of development cooperation by generating know-how and elaborating concepts for the protection and sustainable use of tropical ecosystems. These concepts form the basis for innovative instruments for more environmentally compatible development cooperation. (further information under www.gtz.de/toeb)

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A flexible advisory and research service has been established which supports German development cooperation projects on demand. Research is implemented mainly in cooperation with German universities and results are directly used by the respective projects. Priority areas are:

- Valorisation of Biodiversity
- Political, legal and institutional frame-conditions for sustainable tropical forestry
- Bio-indicators for changes in the environment,
- Ecological and economic prerequisites for sustainable land-use
- Impact of human activities on tropical ecosystems
- Potential and risk of sustainable tourism

In addition, TÖB funds environmental education projects by non-governmental organisations (NGOs) which contribute to environmental conservation. These are financed by the Ministry for Environment (BMU) through surcharge stamp funds. Research activities on PGR could be implemented under “Valorisation of Biodiversity”. However, to date only very few activities with regard to PGR have been implemented in the framework of TÖB:

e.g. Cost/benefit analysis of conservation of PGR in Kenya and Ethiopia (together with Rheinische Friedrich Wilhelms Universität in Bonn, Institute of Agricultural Policy)

Conservation and Management of Agro-biodiversity in Rural Areas

Co-ordinators: Beate Weiskopf, Annette von Lossau

Duration: 1999 – 2006,

Planned

budget: DM 6 million

In July 1999, a new sectoral project on Conservation and Management of Agro-biodiversity in Rural Areas started putting forward an approach which combines animal and plant genetic resources. Based on experience gained to date in technical cooperation, international agricultural research and in collaboration with other important organisations in this area, the project aims at developing concepts and strategies to effectively support developing countries in the sustainable management of their genetic resources. With regard to PGR, one important issue will be the integration of PGR conservation and management in different rural, agricultural and environmental development approaches, such as *rural regional development, sectoral investment programmes, protected areas, buffer-zone management, policy advice, food security programmes*, etc.

In collaboration with ongoing technical cooperation projects which have an interest in this area, conceptual elements will be identified, tested, and implemented. The most important cooperation partners are the International Plant Genetic Resources Institute/IPGRI, the German Center for Documentation and Information in Agriculture/ZADI, the Food and Agriculture Organisation of the United Nations /FAO, national and international non-governmental organizations and universities.

Outlook

The conservation and management of PGR is a priority issue high on the international agenda, and it is also attracting more and more interest in the public sphere. Numerous papers and articles - scientific as well as informative – have appeared in important German and international publications and newspapers. In political and public discussion forums, this topic is accorded top priority; NGOs, in particular, are active in this field of national and international attention.

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There are many requests from developing countries concerning support for workshops, research, cooperation, activities of NGOs, etc. Increasing world-wide public interest provides clear indication that this topic is not a subject of public discussion in developed countries alone, but also in developing countries. International and national organisations are approached for support and assistance in the management of PGR.

However, as in many developing and emerging countries, the importance of agriculture and rural development for German Development Cooperation is declining. The trend in German development politics is not only to limit the number of countries, but also to limit the number of cooperation sectors in any one country. In several countries, agriculture is no longer a priority. In this area of paramount political importance, there remains much to be done in terms of awareness-raising and dissemination of information - also within development administrations – before the desired target is reached, namely that activities and results are in line with both the conventions and the global action plans signed by the Government.

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