Managing Agrobiodiversity in Rural Areas
The 1992 Rio de Janeiro UN Conference on Environment and Development (UNCED) set the stage for a new debate on the utilization of the natural life-support systems of our planet. While in the 1970s and 1980s environmental protection emerged as a major issue in society, in the 1990s the adoption of Agenda 21 and of the Convention on Biological Diversity (CBD) focused attention on the conservation and sustainable use of genetic resources and the requisite legal framework conditions.

To support developing countries in their efforts to implement Agenda 21 and the Biodiversity Convention, the German Federal Ministry for Economic Cooperation and Development (BMZ) commissioned the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH (German Technical Cooperation) to implement the project "Managing Agrobiodiversity in Rural Areas". The Project concentrates specifically on the sphere of agriculture and food security, aiming to enhance the long-term conservation and utilization of plant and animal genetic resources in support of agricultural production. In this endeavour, the Project develops concepts and strategies and supports their integration in technical cooperation activities in the field.

In the area of plant genetic resources, GTZ can draw upon a wealth of more than 20 years of experience. As far back as the 1970s, GTZ was already providing targeted support to partner countries in Africa and Latin America.

The need for conservation

Biological diversity - or 'biodiversity' for short - encompasses diversity at the genetic, species and ecosystem levels. Within individual plant or animal species, genetic diversity is the guarantor of variability - the abundance of plant varieties and animal breeds. Agricultural biodiversity or 'agrobiodiversity' is defined as that part of biodiversity which, within the context of agricultural production, delivers food, contributes to people's
livelihoods and conserves habitats. It is the fruit of thousands of years of observation, selection, exchange and breeding by the world’s farmers.

Plant and animal genetic resources are the primary source material for the further development of crop varieties and animal breeds by farmers and breeders. Equally, biological diversity in agriculture safeguards the potential for natural adaptation to changes in the environment and ecosystems, and for adaptation to shifts in human nutritional requirements.

The small farmers of Africa, Asia and Latin America – and above all the women, who are responsible for the greater part of food production in these countries – are particularly dependent upon genetic resources. A rich diversity of native plant varieties and locally adapted animal breeds secures these farmers’ survival in the face of difficult climatic conditions and marginal soils.

In order to sustain biological diversity in agriculture and thus to secure the foundation for feeding present and future generations, FAO, the Food and Agriculture Organization of the United Nations, called upon the international community to attend a ‘Plant Summit’ in Leipzig in 1996. The summit adopted a Global Plan of Action for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture (GPA). Together with Agenda 21 and the Biodiversity Convention adopted in Rio, this creates a basis for re-adjusting the political coordinates of ecologically and socially sustainable development in agriculture. These instruments provide a framework for integrating more closely the conservation and enhancement of agricultural biodiversity in development planning at all levels – village and community, regional, national and international.

The GPA aims to find solutions tailored to local concerns, be it to support on-farm seed management to encourage the use of neglected food plant species, or to reintroduce locally adapted varieties lost due to civil strife or natural disasters. The Plan of Action addresses four thematic areas: in-situ conservation and development; ex-situ conservation; utilization of plant genetic resources, including under-utilized species; institutional and personnel capacity building, including the promotion of public awareness of the value of plant genetic resources. By signing the GPA, states have committed themselves to its implementation at national level.

The FAO Global Plan of Action (GPA)

Since 1993 the development and implementation of the Global Strategy have taken place. A global focal point was established at FAO to develop its framework. The strategy has been designed to provide a comprehensive framework for the management of farm animal genetic resources. It consists of several inter-related components and elements:

• The intergovernmental mechanism to ensure direct government involvement and continuity of police advice and support
• The planning and implementation structure, providing the enabling framework for country action and regional and global support
• The technical programme of work, aimed at supporting the effective management of animal genetic resources at the country level
• The reporting and evaluation component to provide critical data and information required for guidance, cost-effective planning and action, and to report on the state of diversity, the state of country capacity and the state of art.

The Global Strategy for the Management of Farm Animal genetic resources
FAO data on the erosion of genetic diversity give cause for concern. It is widely assumed that the diversity of cultivated plants has declined by some 75% since the middle of the 19th century. Originally, several thousand crop plant species provided food and clothing. Today, the number has dropped to about 150, and in some places there are only twelve. The situation with regard to livestock is just as bleak. A projected 35% of the mammalian and 63% of the avian genetic resources of the world’s 5400 domestic animal genetic resources that are now registered in FAO’s Domestic Animal Diversity Information (DAD-IS) system are now at risk of loss. 740 breeds are already listed as extinct. If a mere 5% were to be lost over the next year, 2 or 3 breeds of domestic animals would be lost every two weeks. Plant and animal genetic erosion is advancing unabated in many countries. This loss is due largely to the expansion of modern commercial agriculture, with its high-yielding varieties and high-performance breeds. National laws and policies, in some cases driven by international commitments, often promote modern commercial farming systems one-sidedly. Altered patterns of consumption, climatic changes, civil strife, wars and the resulting mass migration are further causes of the loss of genetic resources and associated knowledge.

The loss of agrobiodiversity – and thus of native plant varieties and animal breeds – is increasingly curtailing the access of present and future generations in the South to the genetic material needed for adaptation by breeding. The associated risks are undermining local and regional food security.

Agrobiodiversity erosion and loss

Small-farmer producers depend heavily on genetic resources.
Political forums and disputes

Four international agreements form the main forums in which the conflict relating to agrobiodiversity is currently discussed:

- The Conferences of the Parties to the above-mentioned 1992 Biodiversity Convention, which covers biological diversity, including agricultural biological diversity. Activities are conducted on the basis of a joint programme of work with FAO. Decisions impacting upon agrobiodiversity have also been taken in the process of negotiating a Biosafety Protocol under the CBD.

- The International Undertaking on Plant Genetic Resources (IUPGR), an FAO agreement of 1983, is currently being renegotiated and harmonised with the CBD. The revised International Undertaking is expected to be a legally binding new international agreement, closely linked both to FAO and the CBD. The cornerstone of the International Undertaking is to be a Multilateral System for Facilitated Access and Benefit-sharing for plant genetic resources for food and agriculture.

- The International Union for the Protection of New Varieties of Plants (UPOV), which protects the rights of breeders. The 1978 Act of the UPOV Convention allowed farmers to use also protected varieties freely for cultivation. The Act of 1991 restricted this 'farmers' privilege'. At the same time, the access rights of breeders to certain varieties were limited.

- The World Trade Organization (WTO) agreement signed in Marrakesh in 1994 includes agriculture in the world trade liberalization process for the first time. The WTO/TRIPS (Trade-Related Aspects of Intellectual Property Rights) Agreement requires WTO members to establish patent rights and other intellectual property rights. This also relates to genetic resources, an aspect which has given rise to concern, particularly in developing countries, which fear this will lead to increasing monopolization of access to seed.

Contentious issues

Agrobiodiversity-related issues debated in the above political arenas include the following:

- Who owns biological resources, and who controls access to them?
- How should their use be regulated, and how should the resulting benefits be shared equitably?
- How can local communities receive compensation for their supra-generational breeding contributions?
- How can effective measures be implemented to ensure in-situ conservation of genetic resources for food and agriculture?
- And, finally: Should agricultural produce - and thus food - be subject, in the course of globalization and free trade, to the same economic mechanisms as other commodities?
The sectoral project's service package

By implementing the project "Managing Agrobiodiversity in Rural Areas", GTZ aims to promote collaboration, exchange and networking among the various institutions involved in agrobiodiversity management - in the policy arena, among the research community and in the field. These include institutions in the partner countries, German and international public-, private-sector institutions and non-governmental organizations (NGOs).

The sectoral project advises and supports German development cooperation projects by providing the following services:

- Planning and organizing consultant assignments in projects (project appraisals and project progress reviews)
- Advising governmental bodies and NGOs
- Disseminating know-how, placing experts and establishing contacts among cooperation partners
- Preparing studies
- Developing and refining conceptual approaches
- Promoting exchange of experience among organizations
- Organizing training measures and workshops.

Activities are already in progress together with GTZ projects and their partner organizations in the Maghreb, West Africa, southern Africa, Central America and South Asia.

In addition to bilateral projects, cooperation partners include other BMZ-funded sectoral projects, for instance "Implementing the Biodiversity Convention" and "Political Framework for Biotechnology and Genetic Engineering".

The project promotes self-reliant food security and hence poverty reduction too.

The project, with its supra-regional and cross-sectoral design, focuses on developing long-term concepts and strategies with whose help the erosion of agrobiodiversity can be reduced over the long term. At the same time, the project aims to contribute to raising public awareness on the importance of the diversity of animal breeds and plant varieties for self-reliant food security and thus for poverty reduction. As a part of awareness-raising and strategy development efforts, the project supplies decision-makers in developing countries and the German development cooperation arena with the information and tools needed for political debate and provides advice for interested actors.

Further cooperation partners of GTZ's sectoral project "Managing Agrobiodiversity in Rural Areas"

- Food and Agriculture Organization of the United Nations (FAO)
- International Plant Genetic Resources Institute (IPGRI)
- Centre for Genetic Resources, the Netherlands (CGN)
- German Centre for Documentation and Information in Agriculture (ZADI) with its Information Centre for Genetic Resources (IGR)
- German and international NGOs and networks
- German and developing country universities and research facilities
Examples of GTZ’s work

International agricultural research in cooperation with IPGRI:
The contribution of home gardens to the in-situ conservation of plant genetic resources

Home gardens are micro-environments preserving and utilizing a great diversity of species, varieties and cultivation techniques. Usually cultivated by women, these gardens enrich the diet of families. They are an important source of provisions and income for farming households, but also for resource poor urban families. Previous studies have yielded an understanding of gender issues and the socio-economic value of such gardens. Since 1998, IPGRI, with BMZ/GTZ support, has been exploring new terrain in international agricultural research: in a five-country study, research findings from different continents and ecoregions on biological diversity in home gardens are being exchanged; and methods are being developed to enhance the contribution of these dynamic micro-ecosystems to agrobiodiversity conservation, making greater use of them within the context of in-situ/on-farm measures.

The project involves interdisciplinary teams of scientists from Cuba, Ghana, Guatemala, Venezuela and Vietnam. The German Institute of Plant Genetics and Crop Plant Research (IPK) is supporting the establishment of a worldwide documentation of crop plants and neglected species cultivated in home gardens. Using participatory approaches, the researchers are examining the relationship between agrobiodiversity, income creation and food security. On this basis, they are elaborating practical proposals for cultivating and utilizing specific species in partner countries. A further function of the research findings is to convey to political decision-makers the potential harboured by home gardens.

In-situ/on-farm conservation: Preservation through use

In contrast to ex-situ preservation, on-farm conservation of genetic resources through cultivation and use in farms offers the advantage of further development - for instance through targeted selection - and thus evolutionary adaptation.

The Maya communities in Guatemala grow black pepper in their gardens - a good source of income.

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GTZ is further cooperating with IPGRI in Brazil and Argentina in conserving and utilizing forest genetic resources. In Morocco, within the framework of a global programme, it is collaborating in the development of the knowledge base for in-situ conservation of specific crop species. Nicaragua and Panama have agreed to strengthen their position by networking their activities in the sphere of plant genetic resources. GTZ is supporting this initiative. Cooperation under the umbrella of the REMERFI network comprises promotion of in-situ and ex-situ conservation measures, training, information and data exchange – also via the Internet – and regional coordination in the relevant political frame conditions. In practical work, particular importance is attached to the integration of small farmers and indigenous communities.

A network for plant genetic resources in Central America (REMERFI)

Central America is a region endowed with particularly rich biodiversity. This also applies to economically important crop plants such as maize, beans, gourds or tomatoes. However, genetic erosion is jeopardizing agriculture and thus the development perspectives in the region. In this situation, and in view of advancing globalization, government bodies and research institutes in the agriculture and forestry sectors of Costa Rica, El Salvador, Guatemala, Honduras, Mexico, GTZ is further cooperating with IPGRI in Brazil and Argentina in conserving and utilizing forest genetic resources. In Morocco, within the framework of a global programme, it is collaborating in the development of the knowledge base for in-situ conservation of specific crop species.

Promoting seed production by self-help groups in southern Africa

In the southern African region, the diversity of crop plant varieties important to food security is particularly endangered. For instance, while Zimbabwe’s commercial farming sector uses hybrid varieties to produce for regional and world markets, the farmers’ varieties of maize, sorghum, millet or legume – although economically

Women small-scale farmers in Southern Africa secure their harvests by cultivating a large number of farmers’ varieties.
less important – are the mainstay of the harvests of small farmers. This is why GTZ, in cooperation with the Southern African Development Community (SADC), is supporting a regional project for the production and exchange among village communities of seeds of locally adapted varieties. The aim is to encourage farming households to save and propagate seeds themselves. Practical steps include providing support for local seed fairs at which farmers can offer and exchange their material. Furthermore, in cooperation with local organizations, seed growing pilot projects are used to identify the interactions between local knowledge systems and national research institutes. As there is currently a lack of effective exchange among actors in the seed sector, GTZ places a particular focus upon creating a corresponding network in the region.

Propagating disease-tolerant farm animals in West Africa

In West Africa, animal products and services – meat, milk, traction and dung – are very important. However, the breeders of small and large ruminants suffer recurrent and serious livestock losses caused by tick-borne diseases and by the infestation of their herds by tsetse flies, the vector of trypanosomiasis. Indigenous farm animals such as N'Dama cattle, Djallonké sheep or West African dwarf goats have a strong inherent resistance to these diseases. However, their performance is generally poorer than that of sensitive zebu cattle or other breeds exotic to the region. A regional EU-funded programme for a sustainable strategy for food and income security in the West African tsetse belt thus centres on controlling tsetse flies and ticks and improving disease-tolerant farm-animal breeds. Within this context, GTZ is assisting the International Trypanotolerance Centre (ITC) in the Gambia in the establishment and activities of an applications-oriented research group, whose task is to improve the performance of indigenous farm animals. The project's target group includes both small and more market-oriented farmers.
Promoting postgraduate training in the agricultural sector

The Southern African Centre for Agricultural Research and Training (SACCAR) provides a regional agricultural training programme for 14 southern African countries. This programme promotes postgraduate training, and networks the regional universities and research institutes which address agricultural issues. Activities focus upon the conservation and sustainable use of renewable resources, consequently concentrating upon regionally relevant food security. The universities of 4 countries provide teaching and carry out research in a variety of disciplines. Corresponding programmes are being developed within the context of a GTZ-SACCAR project. In Malawi, for instance, courses on animal genetic resources are being held for scientists, lecturers and decision-makers. The institute for crop production of the university of Zambia is working on the biological diversity of indigenous crop species, cooperating in turn with the SADC Plant Genetic Resources Centre (SPGRC) in Lusaka and IPGRI in Rome.

Seed samples are preserved and classified in Southern Africa’s regional gene bank.

Using traditional knowledge in southern India to preserve plant genetic resources

The Indian subcontinent is home to numerous indigenous communities, most of whom have preserved their traditional way of life and socio-cultural identity. The southern Indian states of Orissa, Kerala, Andhra Pradesh and Tamil Nadu are particularly renowned for their cultural diversity and rich tropical vegetation - a combination which has sustained a sophisticated system of traditional medicine.
However, destructive exploitation of the region’s forests is causing a decline in plant diversity and the associated ethno-botanical knowledge. The Swaminathan Foundation in Tamil Nadu aims to give greater recognition to the prudent methods of indigenous communities in managing biodiversity. A further aim is to counter agrobiodiversity loss by developing improved cultivation systems and conservation strategies. GTZ is promoting NGO training, the establishment of a greenhouse and a community-level gene bank for ex-situ conservation of locally adapted crop varieties and their wild relatives. The project uses documentation software developed by IPGRI, thus ensuring international comparability of the data collected on cereals, legumes, vegetables and grasses. A participatory breeding programme is planned in order to involve indigenous and farming families in on-farm management. A GTZ-financed study on the role of women in the preservation of genetic diversity underscores how urgent it is to regulate rights of use with regard to both material and knowledge.

A community herbarium serves to identify crop plants.
The GTZ ...

is one of the world's largest a service enterprise for development cooperation. Owned by the Federal Republic of Germany, the organisation implement's the Government's activities in the field of Technical Cooperation. The chief client is the Federal German Ministry for Economic Cooperation and Development (BMZ).